ENGINEERING:

An Illustrated Weekly Journal.

EDITED BY WILLIAM H. MAW AND B. ALFRED RAWORTH.

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Cranes.—Steam and Electric. STEAM NAVVIES, GRAB CRANES, SHIPS DECK MACHINERY. John H. Wilson & Co., Ltd. DOCK ROAD, BIRKENHEAD. 5554 London Office:—15, Victoria Street, S.W.

The Norman Thompson Flight Co., Ltd. (Estd. 1909.) CONTRACTORS TO THE ADMIRALTY. "THE FIRM WHO GAVE THE FLYING BOAT TO THE NAVY." ALL BRITISH BUILT. 5399 Works:—MIDDLETON, BOGNOR, ENGLAND. London Office:—DEWAR HOUSE, 11, HAYMARKET. Telegrams—"Soaring, Bognor." Telephones—Bognor 40. "Entityle, Charles, London." Gerrard 7365

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Iron and Steel Tubes and Fittings. The Scottish Tube Co., Ltd., HEAD OFFICE: 34, Robertson Street, Glasgow. See Advertisement page 34. 5385

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Cement.—Maxted & Knott, LTD., Consulting Cement Engineers, ADVISE GENERALLY on proposed Cement Schemes FOR ENGLAND AND ABROAD. ADVICE ONLY. Highest references. Established 1890. Address, BURNETT AVENUE, HULL. Cablegrams: "Energy, Hull." 4334

G. Wilkinson & Sons, KEIGHLEY, are OPEN to UNDERTAKE SPUR GEAR CUTTING, ½ in. to 14 in. pitch, and up to 4 ft. diam. Also IRON CASTINGS. Enquiries solicited. 5489

Generating Sets, Two 375 Kw., triple expansion engines, 440/550 volts D.C. One 375 Kw. Willans-Westinghouse, A.C., three phase, 50 periods, 2200 volts. GENERATOR, 300 Kw., compound, 500 volts. A.C. MOTOR, 275 HP., 40 periods, three phase. A.C. MOTOR, 150 HP., 40 periods, 440 volts, three phase, by Mayer & Coulson. JENNINGS. West Walls, Newcastle-on-Tyne. 6048

R. Heber Radford, Son & Squire, ENGINEERING, IRON AND STEEL WORKS. Established Valuers, over 80 years. CONSULTING ENGINEERS, REFEREES, ARBITRATORS AND PATENT AGENTS. (Senior Partner, R. HEBER RADFORD, Mem. Inst. Mechanical Engineers, Mem. Inst. Naval Architects, Mem. Iron and Steel Inst., Fellow Chartered Institute of Patent Agents. 15, ST. JAMES ROW, SHEFFIELD. 5545 Telegrams: "Radford, Sheffield." Telephone: 426.

Separators — FOR — EXHAUST STEAM TURBINES COMPRESSED AIR, &c. STEAM DRYERS. METALLIC PACKINGS. Princeps & Co., SHEFFIELD. 6191

P. & W. MacLellan, Limited, CLUTHA WORKS, GLASGOW. MANUFACTURERS OF RAILWAY CARRIAGES AND WAGONS OF EVERY DESCRIPTION. RAILWAY IRONWORK, BRIDGES, ROOFING &c. Chief Offices: 120, Trongate, GLASGOW. Od 5647 Registered Office: 108A, Cannon St., London, E.C.

CHANTIERS & ATELIERS Augustin-Normand 67, rue de Paris—LE HAVRE (FRANCE). Destroyers, Torpedo Boats, Yachts and Fast Boats. Submarines and Submersible Boats. NORMAND'S Patent Water-tube Boilers, Coal or Oil Heating. Diesel Oil Engines. 5896

New Chicago Automatics, Three Sizes. Delivery from Stock. NEW CAPSTANS, 1¼ in. through the wire feed. JOHN MACNAB, MART STREET, HYDE. Tel. No.: 78 Hyde. 6319

Yarrow Patent Water-Tube Boilers. 4795 MESSRS. YARROW & CO., UNDERTAKE the PRESSING and MACHINING of the various parts of Yarrow Boilers, such as the Steam Drums, Water Pockets, and Superheaters for British and Foreign Firms not having the necessary facilities. YARROW & CO., LTD., SCOTSTOUN, GLASGOW.

John Bellamy, Limited, MILLWALL, LONDON, E. GENERAL CONSTRUCTIONAL ENGINEERS. 1216 Boilers, Tanks & Mooring Buoys STILLS, PETROL TANKS, AIR RECEIVERS, STEEL CHIMNEYS, RIVETTED STEAM and VENTILATING PIPES, HOPPERS, SPECIAL WORK, REPAIRS OF ALL KINDS.

RAILWAY CARRIAGES, ELECTRIC CARS, &c. Hurst Nelson & Co., Ltd. THE GLASGOW ROLLING STOCK AND PLANT WORKS, MOTHERWELL. Od 3383

Engineers are Prepared to MANUFACTURE MEDIUM MACHINES for Home or Export trade after the war.—R. G. WHITAKER, LTD., Cores Rd., Kingston-on-Thames. 6697

Head, Wrightson & Co., LIMITED. See Advertisement page 42, June 8. 2469

THE GLASGOW ROLLING STOCK AND PLANT WORKS. Hurst, Nelson & Co., Ltd., Builders of RAILWAY CARRIAGES, WAGONS, ELECTRIC CARS and EVERY OTHER DESCRIPTION OF RAILWAY and TRAMWAY ROLLING STOCK. Makers of WHEELS and AXLES, RAILWAY PLANT. FORGING, SMITH WORK, IRON AND BRASS CASTINGS. Registered Office and Chief Works: Motherwell. Cardiff Office: Gordon Chambers, 31, Queen Street. London Office: 14, Leadenhall Street, E.C. See Illustrated Advt. in alternate issues. Od 2308

Railway Switches and Crossings. T. SUMMERSON & SONS, LIMITED, DARLINGTON. 5416

Machine Tools in Stock:— Vertical DRILLS, to admit 18 in., 26 in., and 36 in. diameter. Bolt Screwing MACHINES, 10½ in. centre Special Shaping LATHE. Second-hand PLANER, 25 ft. by 6 ft. by 6 ft. JAMES SPENCER & CO., LTD., Chamber Iron Works, Hollinwood, Manchester. 4900

GOLD MEDAL—INVENTORS EXHIBITION—AWARDED. Duckham's Patent Suspended WEIGHING MACHINES.—MAY FERRY ROAD ENGINEERING WORKS COMPANY, LTD., LONDON, E.—Hydraulic Cranes, Grain Elevators, &c. See Illus. Advt. last week, page 17. 5506

Rubber MANUFACTURERS Hose Steam and Air Drill. GUTTA PERCHA & RUBBER, LIMITED, Toronto - - Canada. 6015

Centrifugals. Pott, Cassels & Williamson, MOTHERWELL, SCOTLAND. 5460 See half-page Advertisement page 13, June 15.

B. & S. Massey, Ltd., MANCHESTER. Steam Hammers, Power Hammers, Drop Stamps, Band Saws. QUICK DELIVERY. LARGE STOCK. 5664

The Manchester Steam Users' ASSOCIATION.
For the Prevention of Steam Boiler Explosions and for the Attainment of Economy in the Application of Steam. 9, MOUNT STREET, MANCHESTER.
Chief Engineer: C. E. STROMEYER, M.I.C.E.
Founded 1854 by Sir W. FAIRBAIRN.
Certificates of Safety issued under the Factory and Workshops Act, 1901. Compensation for Damages and Liabilities paid in case of Explosions. Engines and Boilers inspected during construction. 5884

THE MANCHESTER MUNICIPAL
School of Technology
(UNIVERSITY OF MANCHESTER.)
PRINCIPAL: J. C. M. GARNETT, M.A. (late Fellow of Trinity College, Cambridge).

The SESSION 1917-18 will open on 5th OCTOBER. Matriculation and Entrance Examinations will be held in July and September.
The Prospectus, forwarded free on application, gives particulars of the courses leading to the Manchester University degrees in the Faculty of Technology, and of the provision for Advanced Study and Research in the following departments:—
MECHANICAL ENGINEERING,
ELECTRICAL ENGINEERING,
SANITARY ENGINEERING (including Municipal Engineering),
THE CHEMICAL INDUSTRIES (including General Chemical Technology, Bleaching, Dyeing and Dyestuff Manufacture, Printing, Papermaking, Brewing and Metallurgy),
THE TEXTILE INDUSTRIES,
PRINTING AND PHOTOGRAPHIC TECHNOLOGY,
MINING,
ARCHITECTURE.
Intending students may enrol for the Session 1917-18 from 1st August, 1917. Members of the University under 18 years of age are eligible for membership of the Officers' Training Corps. H 1

STRUCTURAL ENGINEERING.

For Particulars of Course of INSTRUCTION by CORRESPONDENCE, write to "THE WESTMINSTER ENGINEERING BUREAU," 23, Old Oak Road, Acton Park, London, W. 5926

Penningtons. — Engineering Tutors for A.M.I.C.E., A.M.I.M.E. and A.M.I. E.E. Aeronautical Draughtsmanship and Design; Aero Engines.—264, Oxford Road, Manchester. 5397

TENDERS.

MUNICIPAL COUNCIL OF JOHANNESBURG.

Sealed Tenders, endorsed "Tender for Contract No. 923," will be received at the Town Clerk's Office, Municipal Offices, Johannesburg, not later than Twelve noon on Friday, 31st August, 1917, for REFRIGERATING PLANT, at Market Buildings, Newtown, Johannesburg. Drawings and documents can be viewed free on application to the Council's Agents in London, Messrs. R. W. CARLING & CO., St. Dunstan's Buildings, St. Dunstan's Hill, London, E.C., but a deposit of £1 1s. is required for copies. The lowest or any Tender will not necessarily be accepted.
G. S. BURT ANDREWS,
Town Engineer.
Johannesburg, 15th May, 1917. H 145

IN THE MATTER OF THE TRADING WITH THE ENEMY AMENDMENT ACT, 1916.

The PUBLIC TRUSTEE invites

Tenders for the Purchase of the Whole or any part of 119,660 Shares of £5 each, fully paid, in SIEMENS BROTHERS & COMPANY, LIMITED, vested in him as Custodian by an Order made by the Board of Trade, in pursuance of Section 4 of the Trading with the Enemy Amendment Act, 1916, and dated 9th August, 1916.
The issued capital of the Company consists of 120,000 Shares of £5 each, fully paid.
The purchasers, who must be British-born subjects, will be required to make a sworn Declaration as to nationality and freedom from foreign control on a form to be obtained from the Offices of the Public Trustee.
The purchasers will also be required to satisfy the Public Trustee as to their financial and technical ability to carry on the business of the Company as efficiently as heretofore, or otherwise to the satisfaction of the Government.
A report upon the Company's operations and affairs has been prepared by the Company, in conjunction with the Company's Auditors (Messrs. PRICE, WATERHOUSE & Co.), and with Messrs. TURQUAND, YOUNGES & Co. Copies of this report can be obtained, subject as hereinafter mentioned, together with copies of Company's accounts up to the 31st December, 1915, on written application to the Public Trustee, Kingsway, W.C.
All applicants will be required to satisfy the Public Trustee as to any matter which he may think fit to investigate before copies of such Report or accounts will be supplied.
Intending Tenderers who desire to inspect the property of the Company, should apply to the Public Trustee for an authority to do so.
Tenders must be delivered, sealed, to the Public Trustee, Kingsway, W.C., on or before Thursday, the 12th July, 1917 (NOT 14TH JUNE, AS PREVIOUSLY ADVERTISED), at Twelve o'clock Noon, and marked on the envelope, "Tender, Siemens Shares."
The Public Trustee does not bind himself to accept any Tender, and reserves to himself all rights in connection therewith.
Forms of Tender can be obtained from the PUBLIC TRUSTEE.
Dated this 8th day of February, 1917. 5943
C. J. STEWART, Public Trustee,
Custodian for England and Wales.

APPOINTMENTS OPEN.

Chief Mechanical Inspector WANTED for large Works in the Midlands; one capable of taking entire charge of inspection of an output of from £5,000,000 to £10,000,000 per annum. Applicants must have had a thorough training in modern shop practice of an accurate nature and sound experience of general inspection. Salary £1000 a year.—Applications, giving full details of training, experience, age, and complete addresses for references, to H 118, Offices of ENGINEERING.

Wanted, by a Leading Boiler Insurance Company, additional BOILER INSPECTORS. Applicants must be practical engineers with a good technical training, capable of making accurately dimensioned sketches of all classes of steam boilers and of writing clear reports on condition. Commencing salary £12 10s. per month, plus war bonus. Applicants must be over military age, but not exceeding 45 years.—Address, H 58, Offices of ENGINEERING.

Inspectors (Skilled) for Aeroplane Engine work, &c. No person already engaged on Government work need make application.—Apply, stating full particulars, to your nearest EMPLOYMENT EXCHANGE and quote reference No. A3333. H 98

WIGAN AND DISTRICT MINING AND TECHNICAL COLLEGE.

Applications are Invited for the POSITION of ENGINEERING LECTURER for Day and Evening Classes.
Salary: £150, rising by £10 annually to £180, together with War Bonus of 10 per cent.
Further particulars can be obtained from the undersigned, to whom applications should be sent before July 14th.
S. C. LAWS, M.A., B.Sc.,
Principal.
22nd June, 1917. H 97

KENT EDUCATION COMMITTEE.

MUNITIONS TRAINING CLASSES.

Wanted, Immediately, for Munitions Training Centre, Qualified INSTRUCTORS.
(1) In Metal and Lathe Work (especially Turning). Trade experience essential.
(2) In Metal Work for Children at Elementary Schools.
Apply, stating salary required, to DR. J. LISTER, Technical Institute, Tunbridge Wells.
FRAS. W. CROOK, Secretary.
June, 1917. H 140

DORSET COUNTY COUNCIL.

EDUCATION COMMITTEE.

WEYMOUTH SCHOOL OF ENGINEERING.

Applications are Invited for the Post of ASSISTANT MASTER for Afternoon Classes at the above-mentioned School, which will be opened in September next. Qualifications in Elementary Engineering Science, combined with some workshop experience, essential. Commencing salary £120 per annum. If the successful candidate is a capable Mechanical Draughtsman employment for his morning hours may be found with a private firm. Applications, on forms to be obtained from the undersigned, must be sent in not later than the 17th July, 1917.
CLEMENT G. BONE,
County Offices, Dorchester.
25th June, 1917. H 128

UNIVERSITY COLLEGE, NOTTINGHAM.

DEPARTMENT OF ENGINEERING.

A Lecturer in Electrical Engineering is REQUIRED to commence work in September. The appointment will be for the duration of the War, and will be reviewed on its termination.
Full particulars concerning salary, &c., and forms of application may be obtained from—
J. H. SHIMELD,
Acting Registrar. H 138

PORT-OF-SPAIN CITY COUNCIL.

POST OF CITY ENGINEER.

The Port-of-Spain City Council invite

Applications for the Post of CITY ENGINEER, and ENGINEER OF WATER AND SEWERAGE WORKS, with which is associated also the general supervision of the management of the Woodbrooke Estate and the Cocorite Farm.
1. The salary attached to the post is £660 a year, rising by annual increments of £75 a year to a maximum of £750; with an allowance of £75 a year, towards the upkeep of a motor vehicle for the performance of his duties.
2. The appointment is subject to the approval of the Governor.
4. The office is pensionable under the Port-of-Spain Corporation Ordinance, 1914.
5. Salary will commence from the date of arrival in Trinidad. No allowance is made in respect of passage.
6. Candidates must submit evidence of their being corporate members of the Institution of Civil Engineers of England, and of possessing experience in the designing, construction and maintenance of waterworks and sewerage systems.
7. Should the officer be desirous of leaving the service of the Corporation within five years from the date of his appointment, the Council reserve to themselves the right to exact not less than three months' notice in writing.
8. The Engineer will be required to reside within the City or within a mile of the City, and to devote his whole time to the service of the Corporation.
9. The successful candidate will be required, within one month of the date of his arrival in the Colony, to furnish a bond, with an approved surety, or to enter into a bond with an approved guarantee society, in the sum of £500 for the due performance of the duties of the office.
10. The successful candidate must be prepared to take up the duties of his office within three months of the date of his receiving the official intimation from the Town Clerk that his appointment has been approved by the Governor.
11. Applications, accompanied by not more than two recent testimonials (one of which should be from the candidate's present employers), and stating age and previous experience, together with a medical certificate that the candidate is fit for service in the West Indies, must reach the Town Clerk, Port-of-Spain, Trinidad, not later than the 1st December, 1917.
PHILIP H. SALOMON,
Acting Town Clerk.
Town Hall,
Port-of-Spain,
Trinidad, B.W.I. H 119

LONDON COUNTY COUNCIL.

APPOINTMENTS IN TRAMWAYS DEPARTMENT.

The London County Council invites

Applications for the Under- mentioned POSITIONS in the Tramways Department:—
(1) Rolling Stock Engineer. Salary ranging from £1000 to £1100 a year according to qualification.
(2) Permanent Way Engineer. Salary ranging from £800 to £1000 a year according to qualification.
Applications must be on the official forms, which specify the conditions upon which the appointments will be held and the principal duties of the positions.
The forms may be obtained from the Clerk of the Council, County Hall, Spring Gardens, S.W. 1, and must be received by him not later than Four p.m. on Monday, 9th July.
An addressed foolscap envelope, bearing 1d. stamp for each form required, must be sent with each request for a form or forms of application.
JAMES BIRD, H 100
Clerk of the London County Council.

Metallurgists and METALLURGICAL CHEMISTS (temporary) REQUIRED.
Commencing salary £300 per annum.
Applications, giving full particulars of qualifications and experience to be forwarded to the
SUPERINTENDENT OF RESEARCH,
Royal Arsenal,
Woolwich.
H 87

Chemist (Works), used to general metallurgical analysis. No person already engaged on Government work need apply.—State full particulars at your nearest EMPLOYMENT EXCHANGE, quoting reference No. A 3334. H 117

First-class Experienced ESTIMATOR WANTED by Government controlled works making large and small engines, repetition and general work; man with thorough practical knowledge of machining, fitting and foundries, &c., who could organize and control a department dealing with rate-fixing, progress and demonstration. Only men thoroughly experienced need apply. Permanent position to suitable man. State age, experience and salary required. No one already employed on Government work will be engaged.—Apply your nearest EMPLOYMENT EXCHANGE, mentioning this Journal and H 29.

Wanted, Chief Mechanical and Electrical ENGINEER, to take full charge of big London Oil Mills. Only those with thorough theoretical training, practical experience and excellent testimonials are invited to write to Y., BOX 542, care of JUDDS, 97, Gresham St., E.C.2. H 141

Foundry Superintendent WANTED, for large Aluminium Foundry on Government work. Must have good practical experience, be good organiser, and able to control men. Good salary and commission to right man. Permanency.—Address, giving full details as to qualifications, stating age, salary required, &c., H 130, Offices of ENGINEERING.

Wanted, a Blast Furnace MANAGER to take charge of one or two furnaces (Basic Iron).—Address, stating age, experience and salary required, H 115, Offices of ENGINEERING.

Graduates in Pure Science WANTED, to enter large factory manufacturing optical and electrical instruments, with a view to learning practical work and later undertaking experimental research. Must be free from any obligation to military service.—Address, stating age, wages expected, and details of training, H 134, Offices of ENGINEERING.

Assistant Engineer Required immediately for a controlled establishment in South West of England, exclusively employed on Government work. Must have sound theoretical and practical training, and should preferably have been engaged upon aeroplane or seaplane construction. Capable organizer, with good experience of repetition work. No person already on Government work will be engaged.—State age, full particulars of past experience and salary required to your nearest EMPLOYMENT EXCHANGE, mentioning Box number A 3315. H 49

Assistant Engineer is REQUIRED by a large Firm of Iron Masters and Colliery Owners in the Midlands. Must be six o'clock man, keen, energetic, and capable of carrying out general maintenance work quickly and economically. In reply give full particulars of previous experience, age, when at liberty and salary expected.—Address, H 56, Offices of ENGINEERING.

Aircraft Firm, N.W. London, has VACANCIES for several DRAUGHTSMEN. Previous experience of aeroplanes not essential. No one already engaged on Government work or resident more than ten miles away need apply. State age, experience and salary.—163, BELL'S Advertising Offices, Fleet Street, E.C. 4. H 110

Head Designer Required for Admiralty Establishment. Experience required of small high-class mechanical work. State age, present salary, details of previous experience with approximate periods employed at each firm and position.—Reply to BOX No. 1141, care of Messrs. R. F. WHITE & SON, General Advertising Agents, 55, Fleet Street, London, E.C. 4. H 103

Draughtsmen Wanted by En- gineering Firm for most urgent work in connection with Shipbuilding. Applicants must have had experience of marine engines or turbines for propelling purposes. Only those not on Government work considered. State age, experience, and salary required.—Apply, your nearest EMPLOYMENT EXCHANGE, mentioning this Journal and H 137.

Draughtsman, used to Graphi- cal work and general shop problems. No person already engaged on Government work eligible.—Apply, stating full particulars to your nearest EMPLOYMENT EXCHANGE, quoting reference No. A 3339. H 103

Mechanical Draughtsman WANTED immediately for Government controlled establishment in South-west of England. Aircraft experience desirable but not essential. No person already on Government work will be engaged.—Apply, giving full particulars as to training, age, salary required, to your nearest EMPLOYMENT EXCHANGE, mentioning No. A3342. H 106

Jig and Tool Draughtsmen, WANTED at once on urgent Aero Engine Work. Must have had experience on tool work. Good pay and bonus. Detailers also wanted. None on Government work will be considered.—Apply at your nearest EMPLOYMENT EXCHANGE, quoting reference No. A 3398. H 102

Wanted, First-class Jig and Tool DRAUGHTSMEN, accustomed to automobile work. London, N.W. district. State age, experience and salary expected. Those beyond the 10 mile radius or on Government work need not apply.—Address, H 113, Offices of ENGINEERING.

Competent Jig and Tool DRAUGHTSMAN for large Automobile Factory. Thorough knowledge of modern methods and machine tools essential.—State age and salary required to your nearest EMPLOYMENT EXCHANGE, quoting No. A3354. No person already on Government work will be engaged. H 135

Turbines.—Draughtsmen WANTED, by large firm in North of England, who have had experience in turbine design. JUNIORS also required. No person already engaged on Government work can be considered. Positions permanent.—Apply, stating age and salary required, to your nearest EMPLOYMENT EXCHANGE, mentioning this Journal and H 133.

Wanted, Draughtsman for the mechanical design of large electrical direct current machines. Nobody engaged on Government work will be accepted.—Write or apply to the nearest Board of Trade EMPLOYMENT EXCHANGE, mentioning this Journal and No. A 3331. G 457

Wanted Immediately, in the Midlands, a DRAUGHTSMAN accustomed to blast furnace upkeep and repairs. No one already employed on Government work will be engaged. — Reply, stating age, experience and salary required, to your nearest EMPLOYMENT EXCHANGE, mentioning this Journal and H 27.

Draughtsman Wanted, thor- oughly capable, for large blast furnace and steel works plant. State age, experience, salary required, and when at liberty. No one already employed on Government work will be engaged.—Apply, your nearest EMPLOYMENT EXCHANGE, quoting No. A 3295. G 996

Draughtsmen who are Ex- perienced in the lay-out of power stations (municipal and industrial) are REQUIRED by a large firm of mechanical and general engineers in the North. Those already engaged on Government work cannot be considered.—Apply, stating experience, salary, age, &c., to your nearest EMPLOYMENT EXCHANGE, mentioning this Journal and H 131.

Required, Immediately, for a Controlled Engineering Works, S.E. London,
DRAUGHTSMAN (Mechanical or Marine).
Ditto (with knowledge of Estimating Weights of Castings).
DRAWING OFFICE CLERKS (one Male, one Female).
Junior applicants must have had several years' experience. No applicants residing outside radius of ten miles or already employed on Government work can be engaged.—Address, stating age, experience and salary required, H 101, Offices of ENGINEERING.

Draughtsmen.—Several Juniors WANTED quickly for Government work in Midland Engineering Works. Permanent jobs for suitable men.—Apply, stating age, experience fully, salary expected, and when at liberty, to your nearest EMPLOYMENT EXCHANGE, mentioning this Journal and No. A 3306. No person already on Government work will be engaged. H 44

Wanted, Several First-class Mechanical DRAUGHTSMEN, with good all-round experience, for Admiralty work.—Apply (by letter only), stating age, experience, and present salary to BOX No. 1153, care of Messrs. R. F. WHITE & SON, Genl. Advng. Agents, 55, Fleet Street, E.C. 4. H 122

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Wanted, One or Two DRAUGHTSMEN with experience in civil and mechanical engineering work, in connection with lay-outs for electric power stations. Also ASSISTANT to act as Clerk-of-Works.
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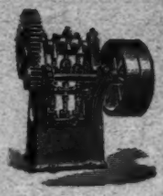
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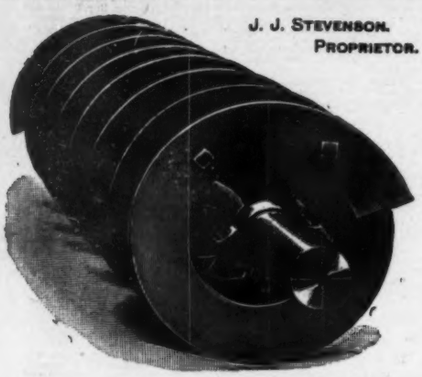

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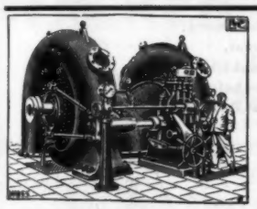

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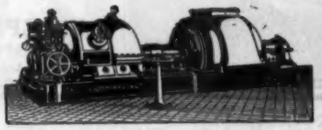

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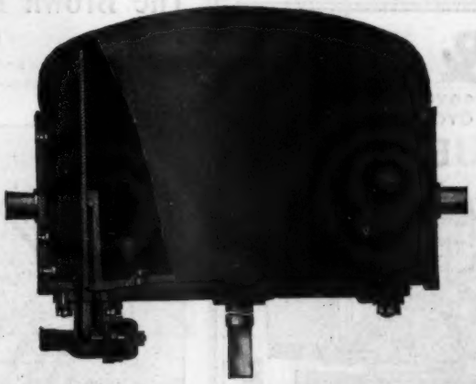

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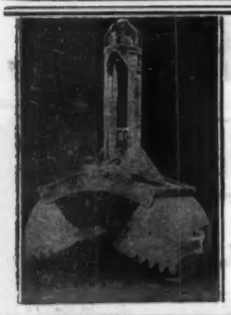

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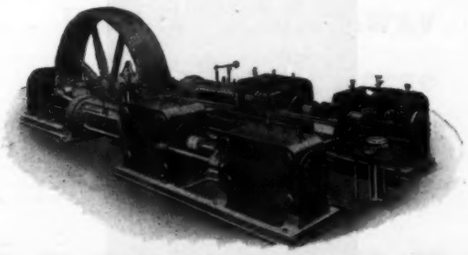

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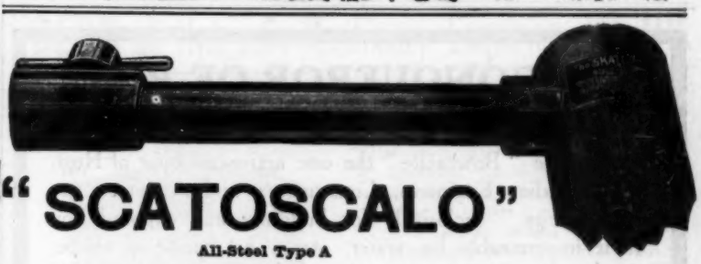

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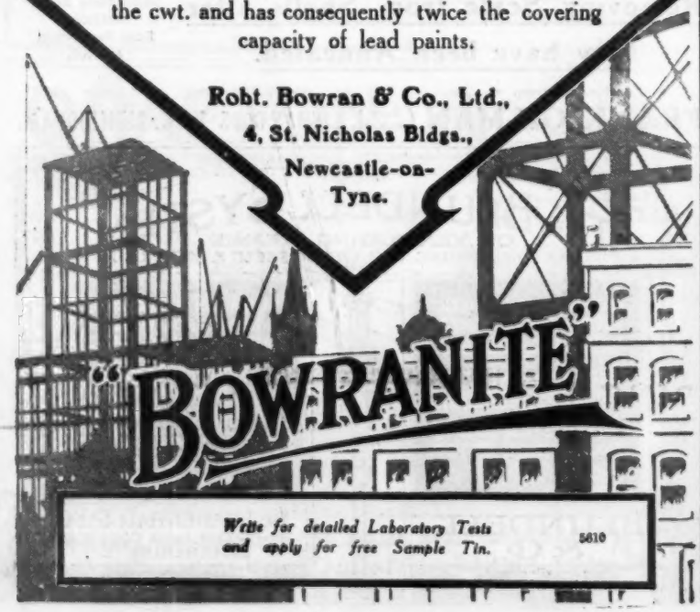

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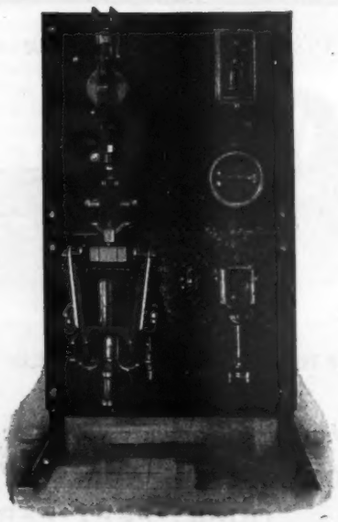

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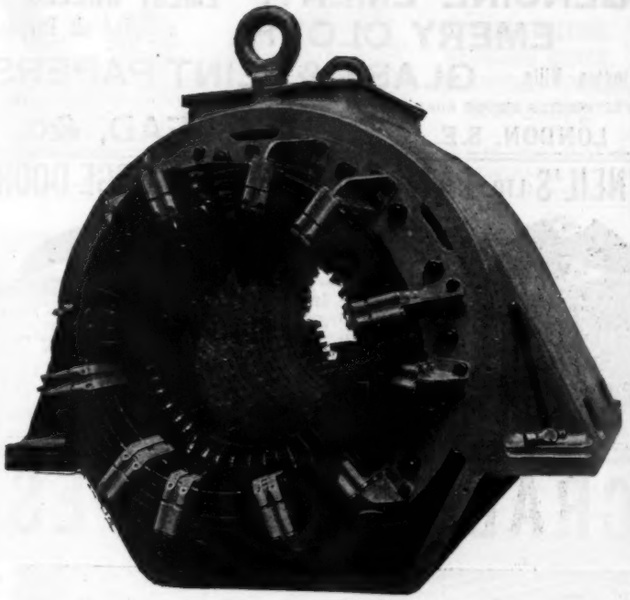

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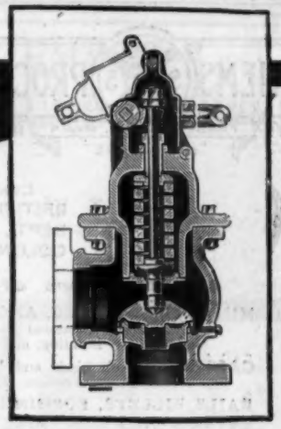

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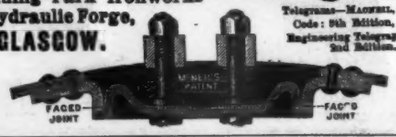

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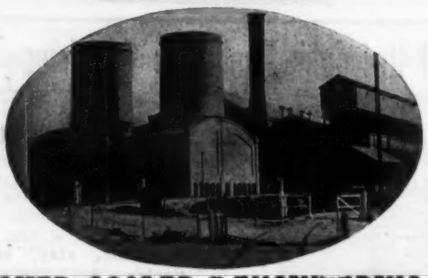

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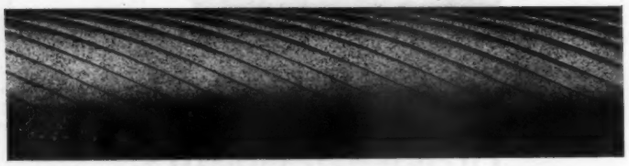

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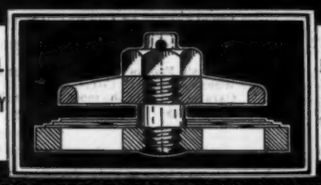

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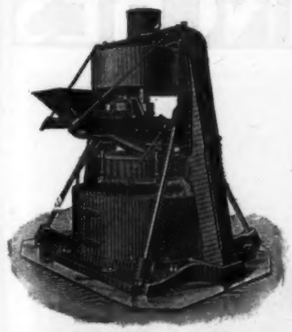

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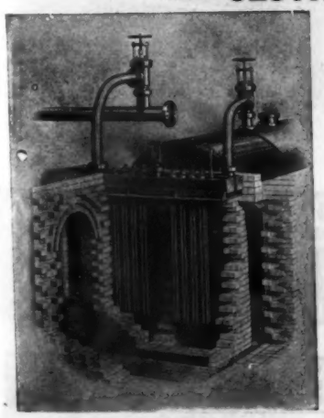

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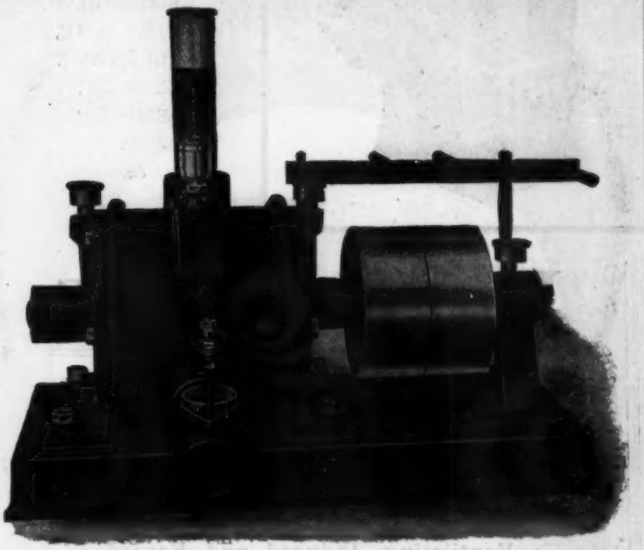

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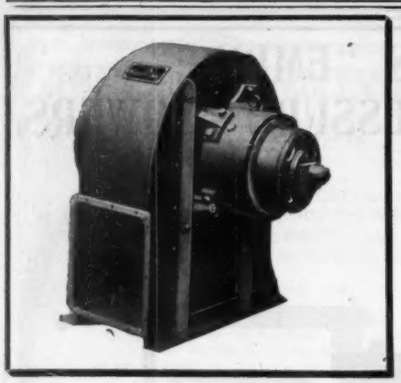

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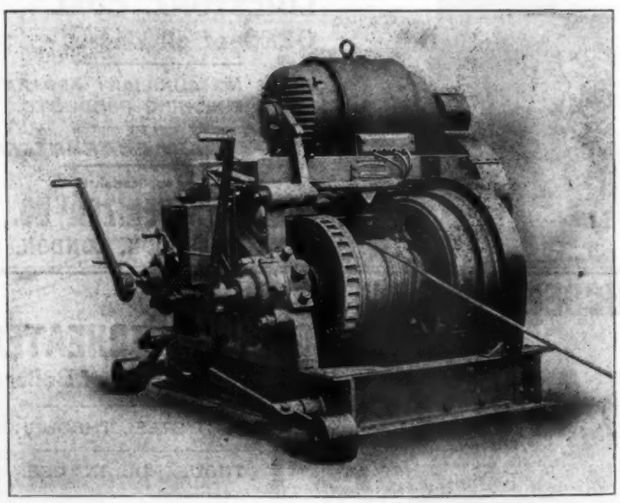

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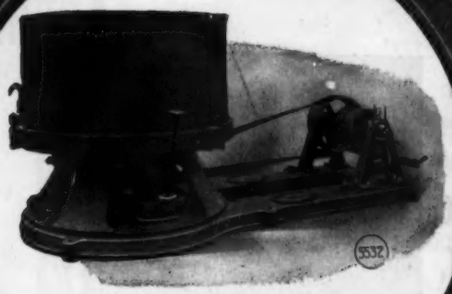

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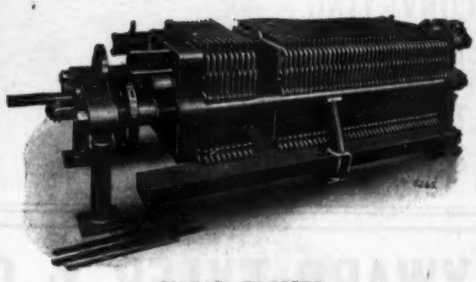

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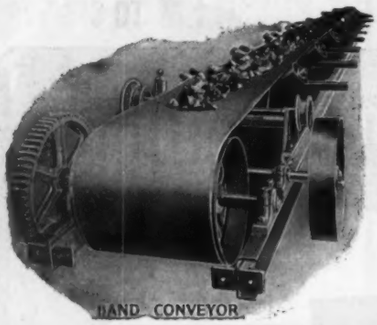
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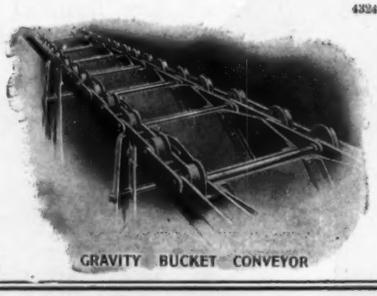
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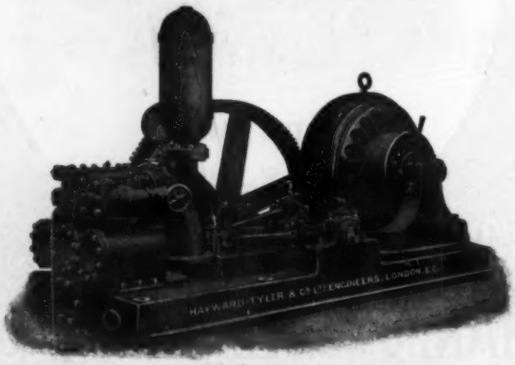

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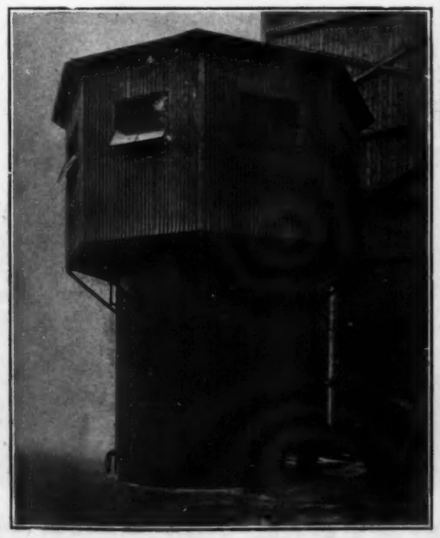

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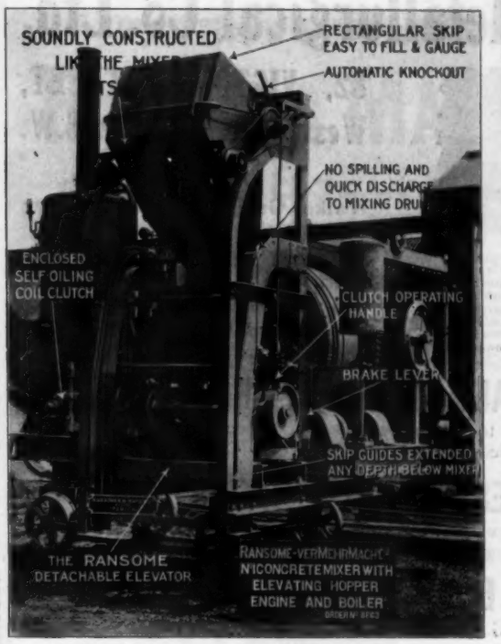

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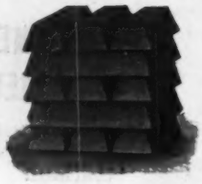

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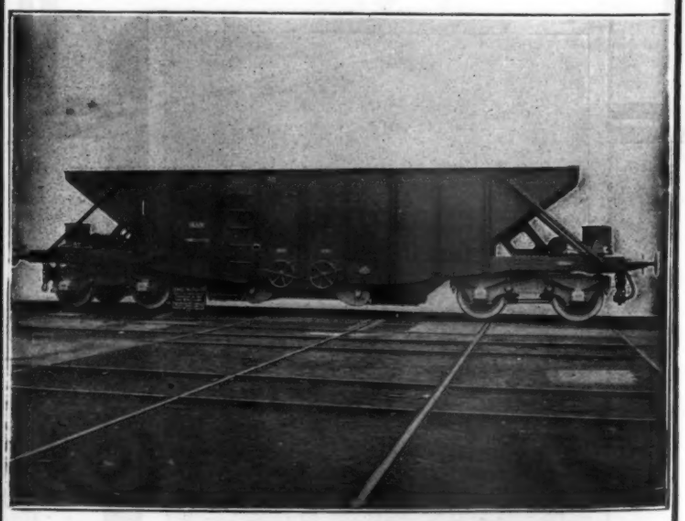

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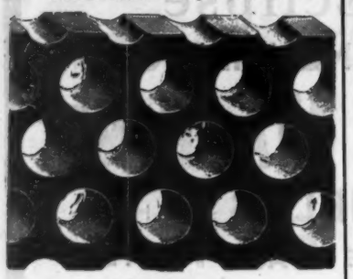

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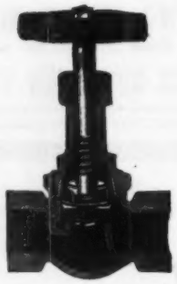

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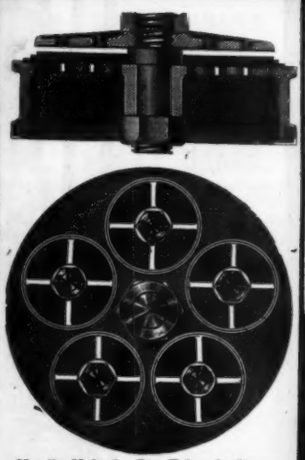

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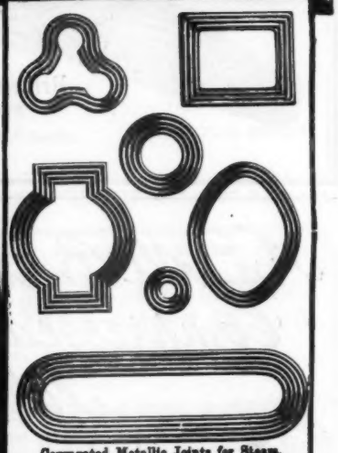

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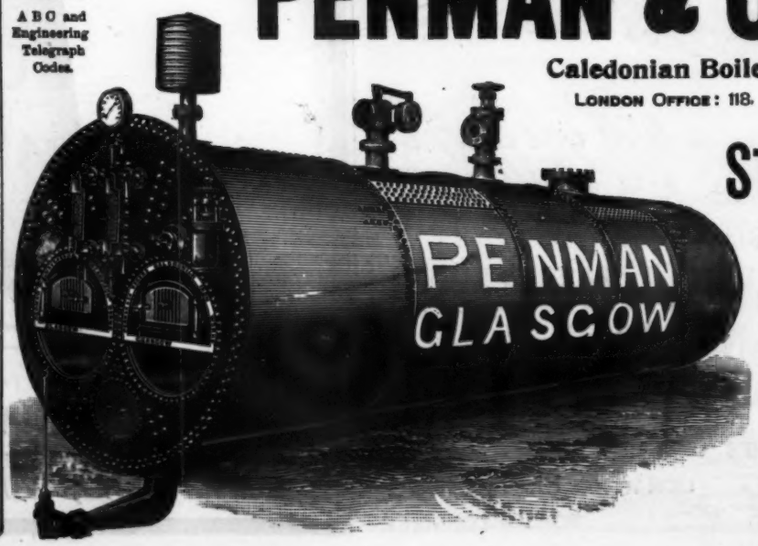

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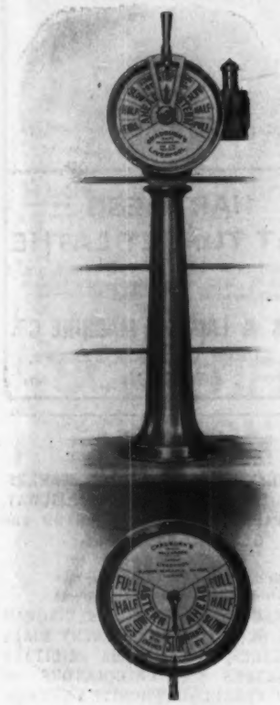

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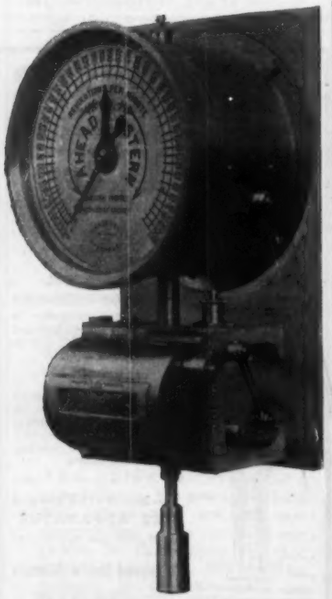

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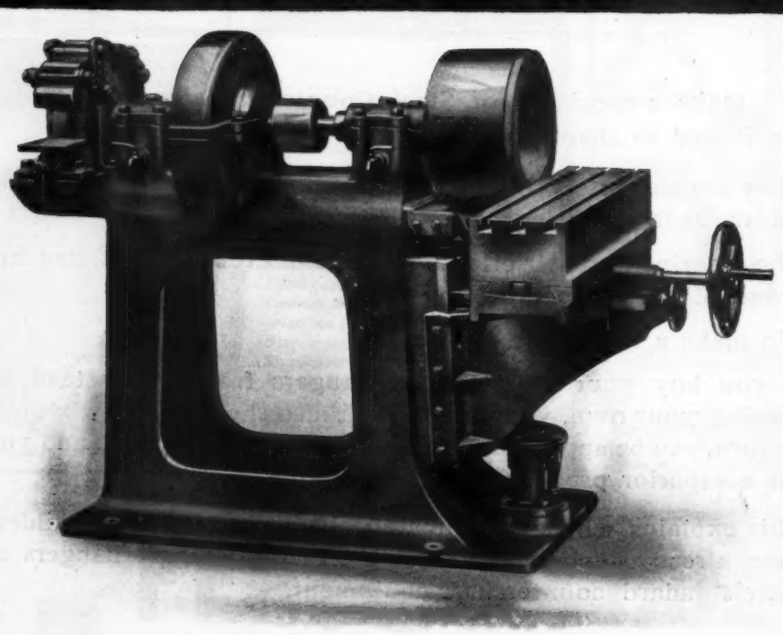

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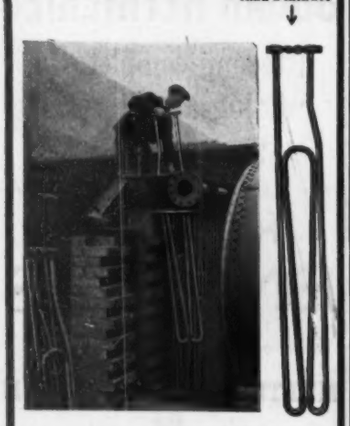

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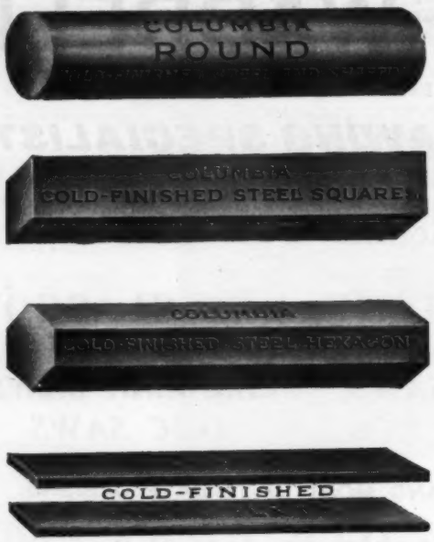

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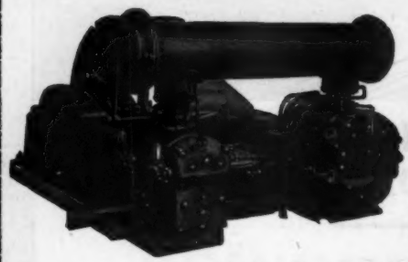

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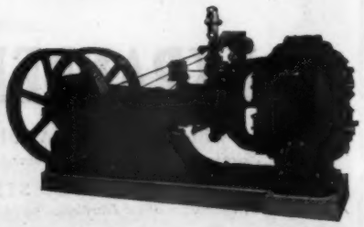

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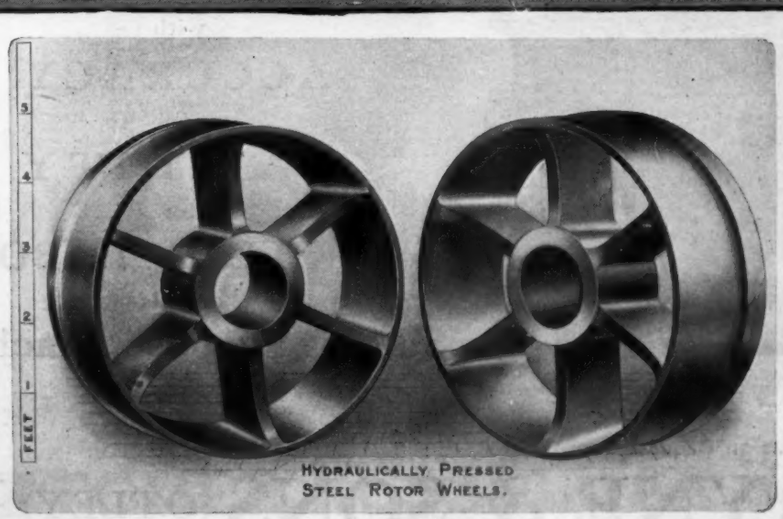

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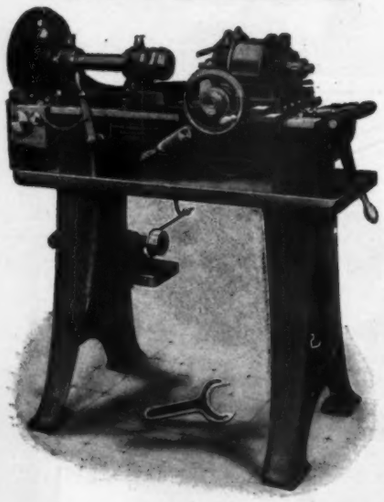

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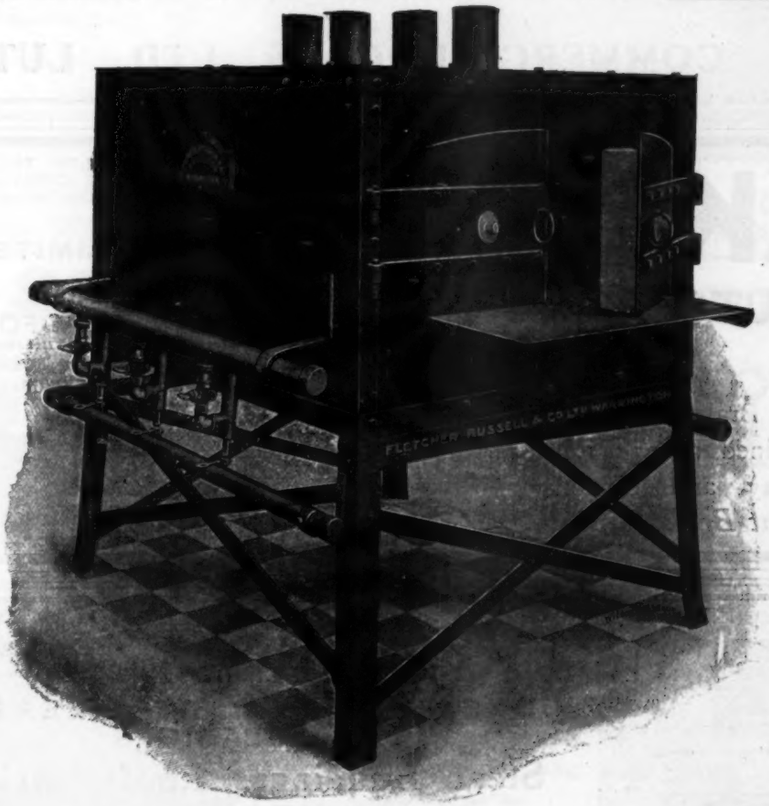

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Fig. 4154.

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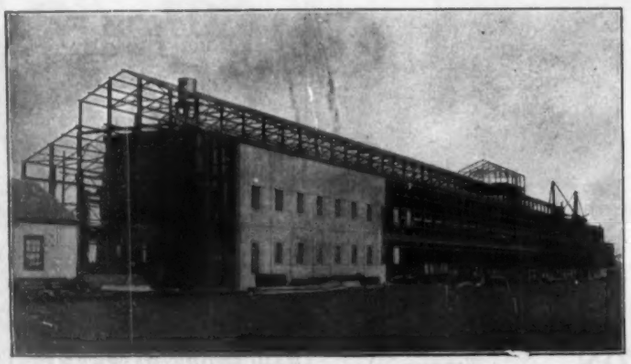

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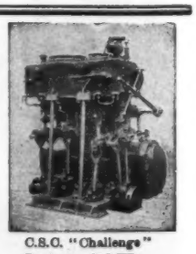

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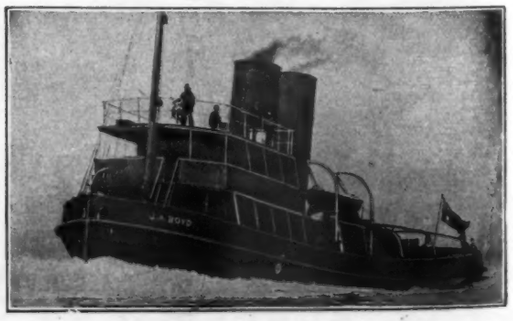

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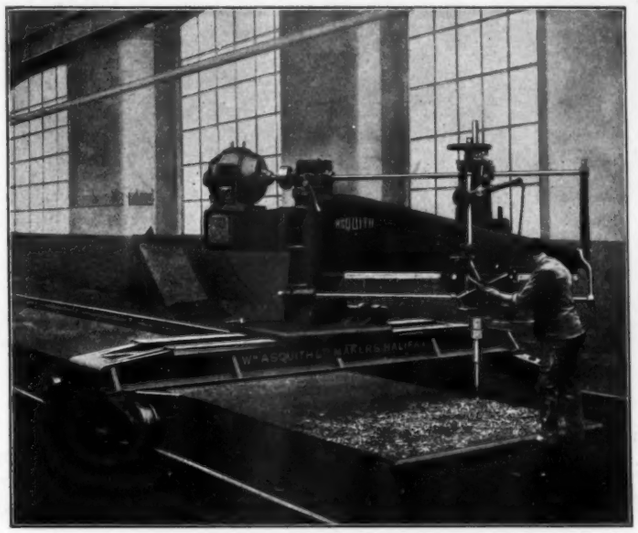

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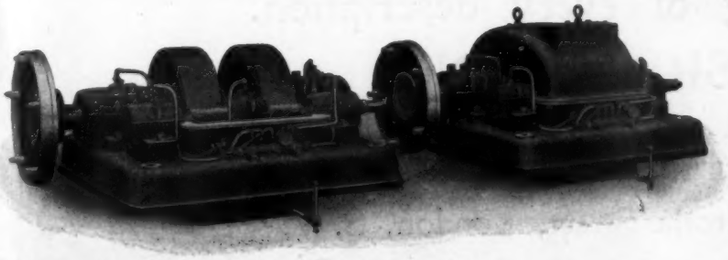

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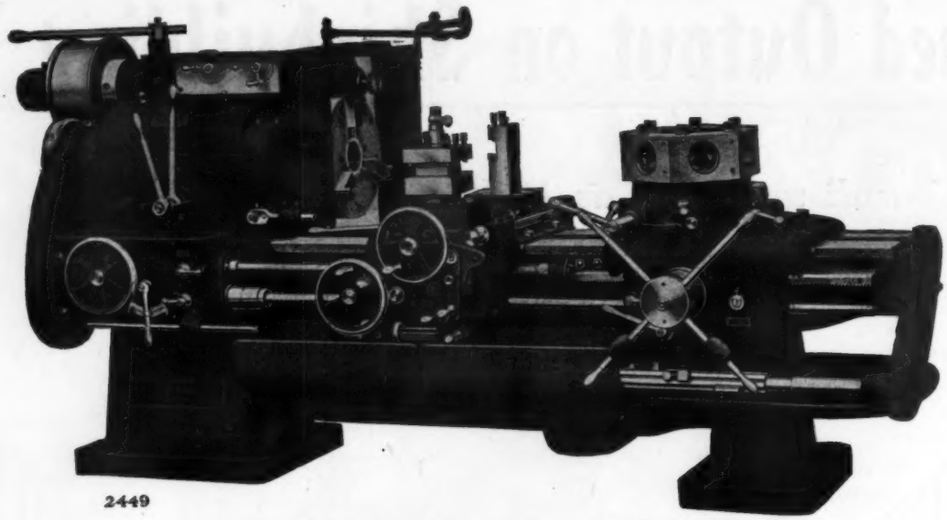

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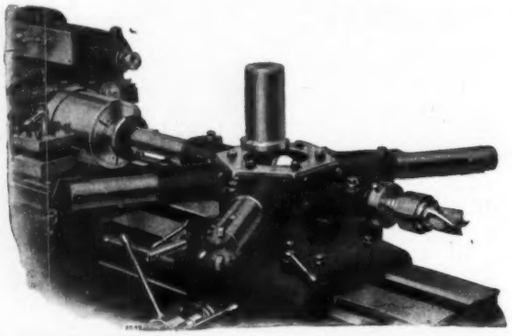

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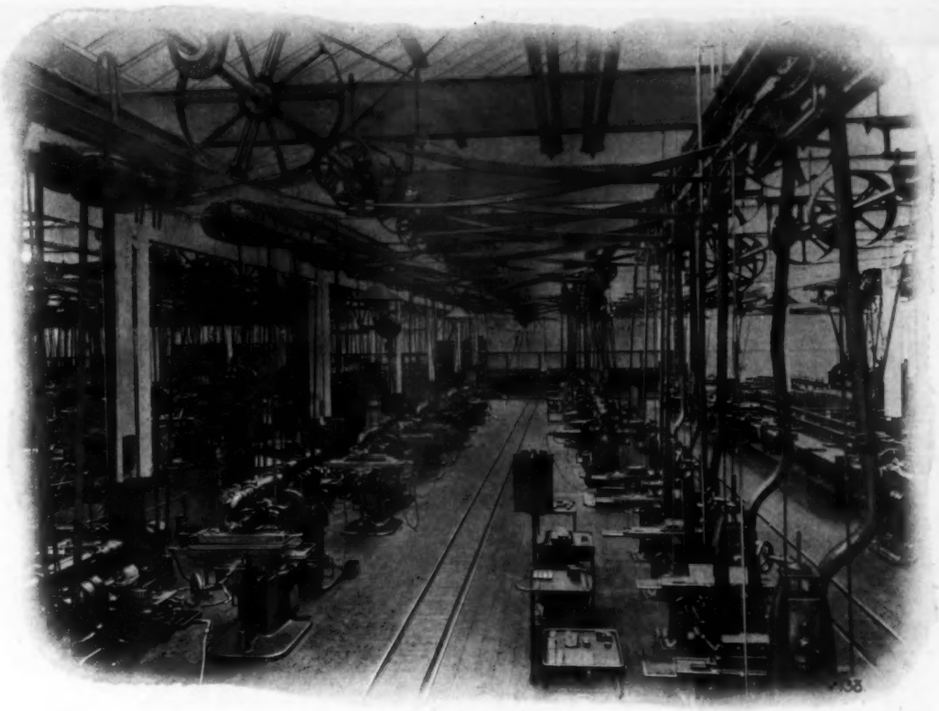

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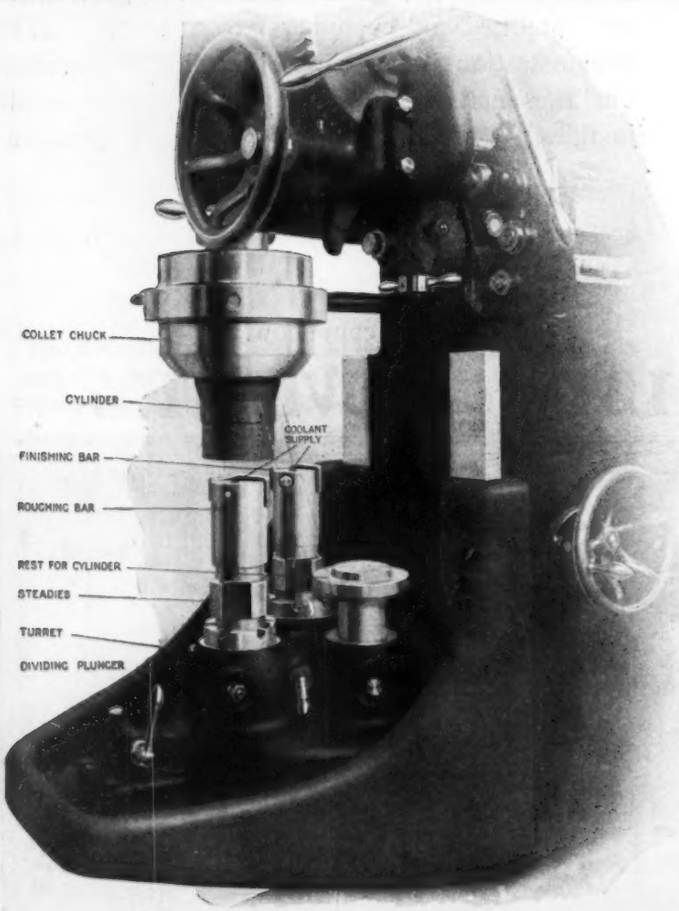

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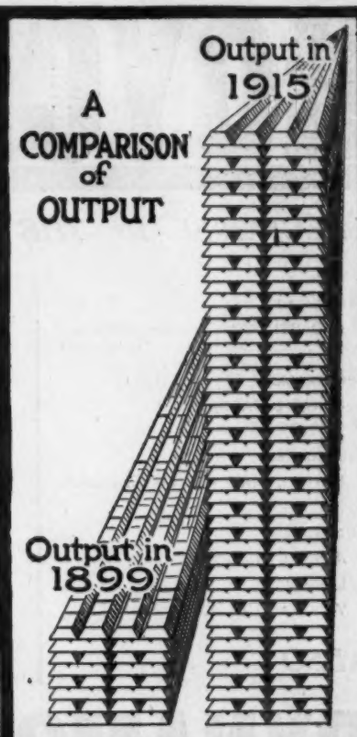

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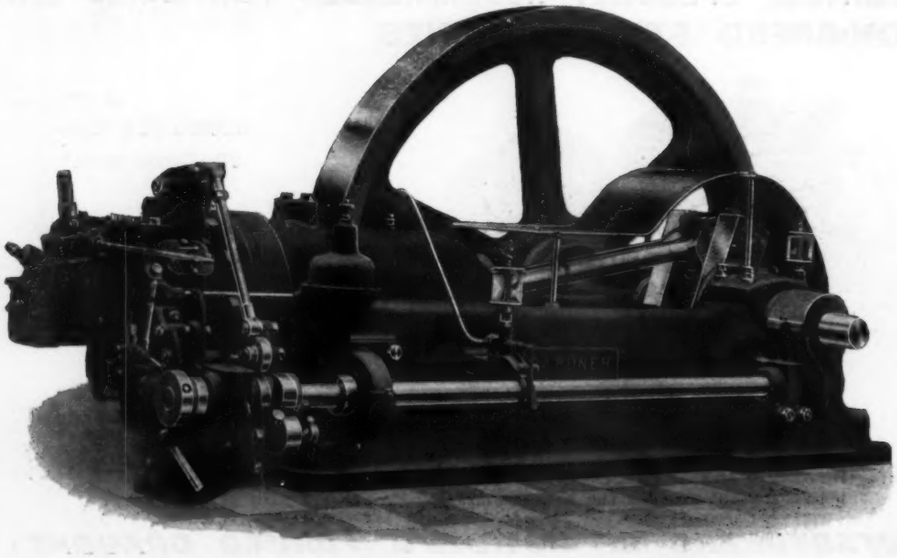

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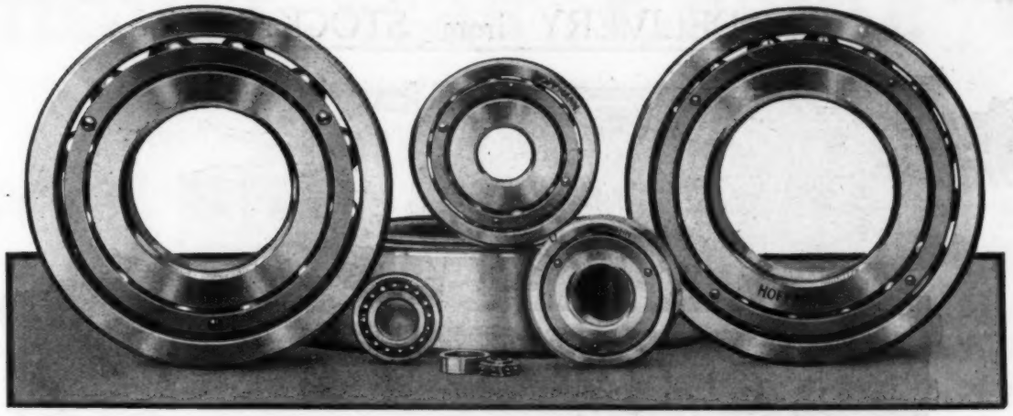

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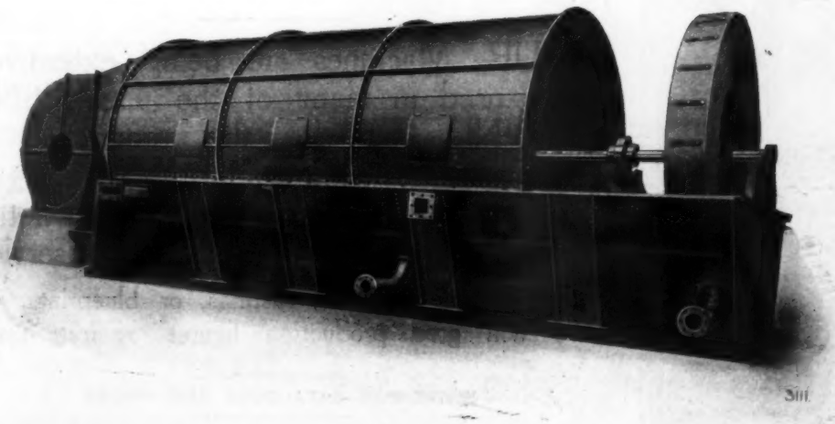

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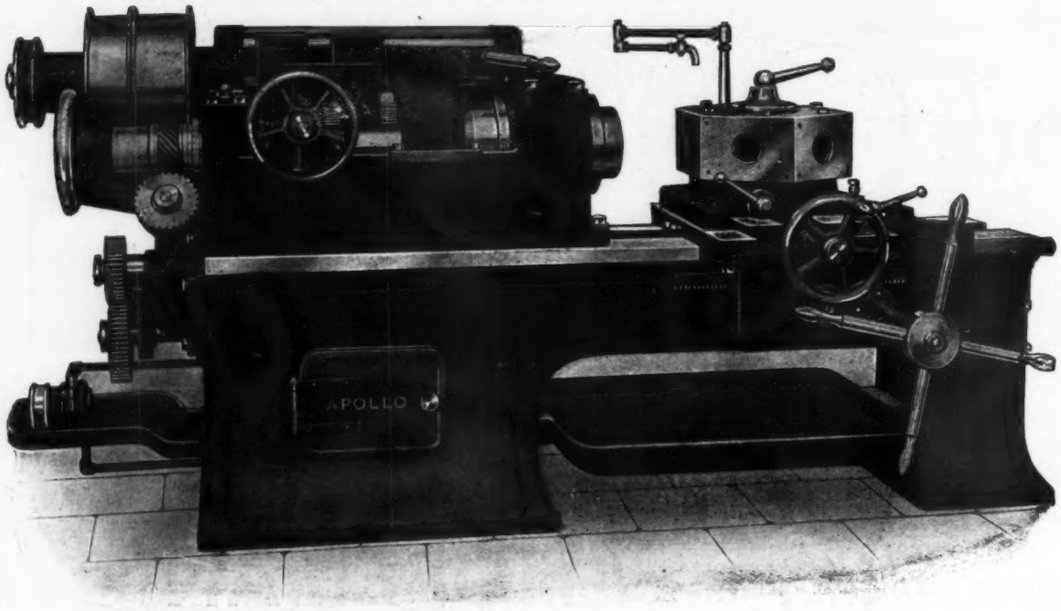

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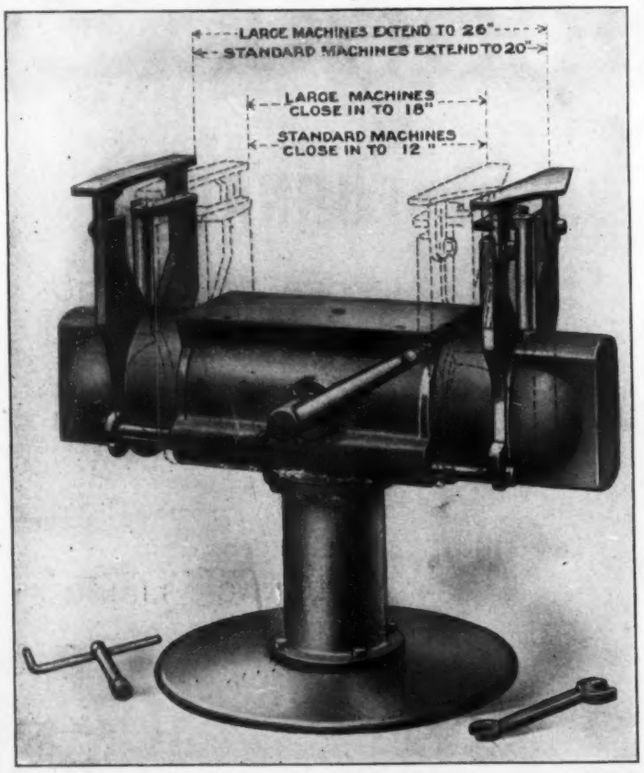

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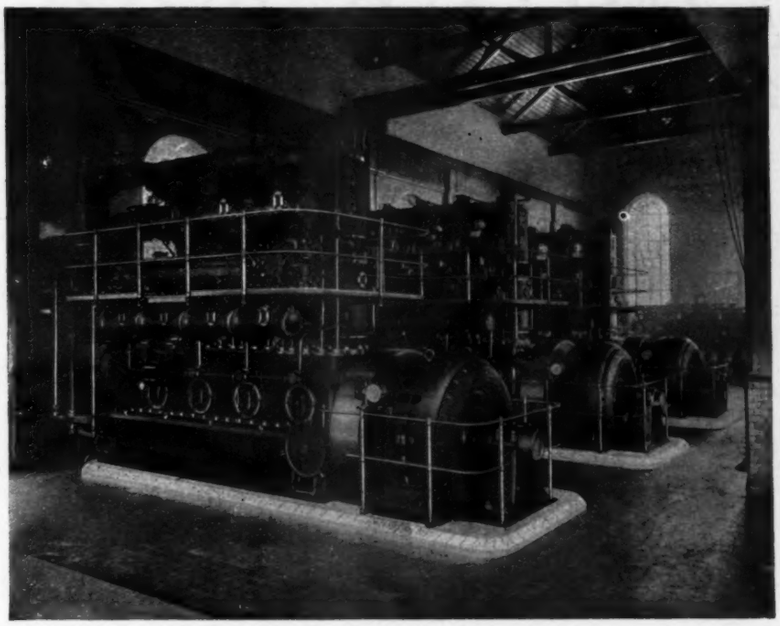

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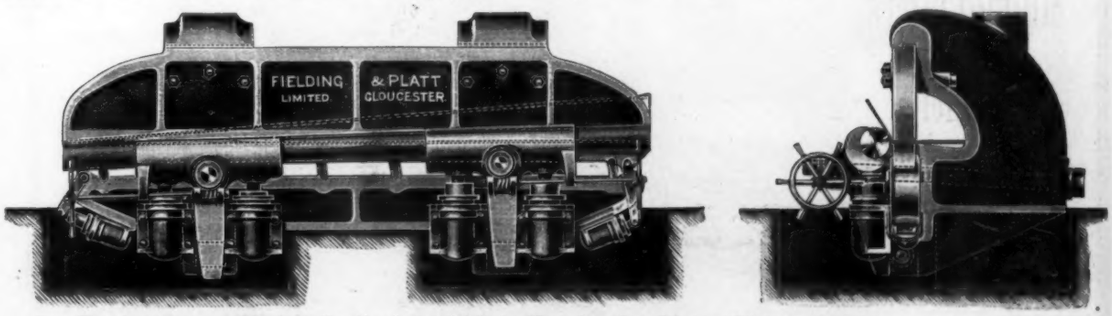

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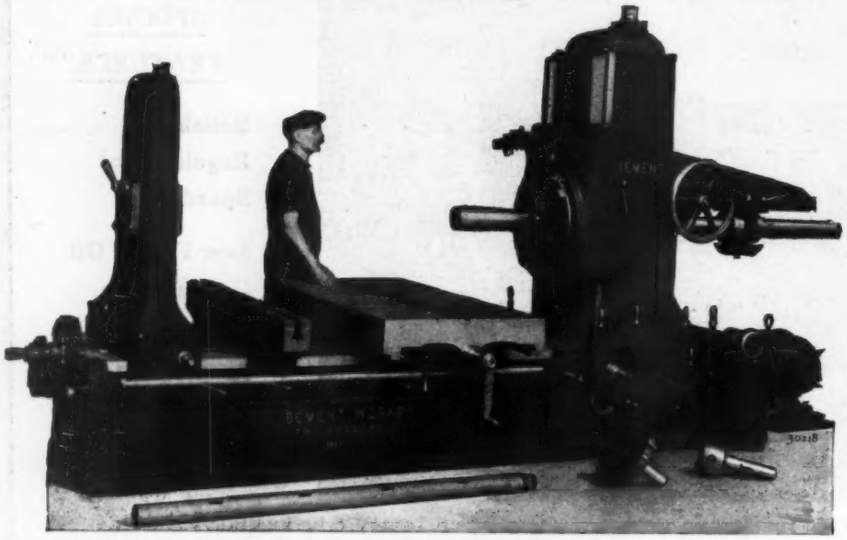

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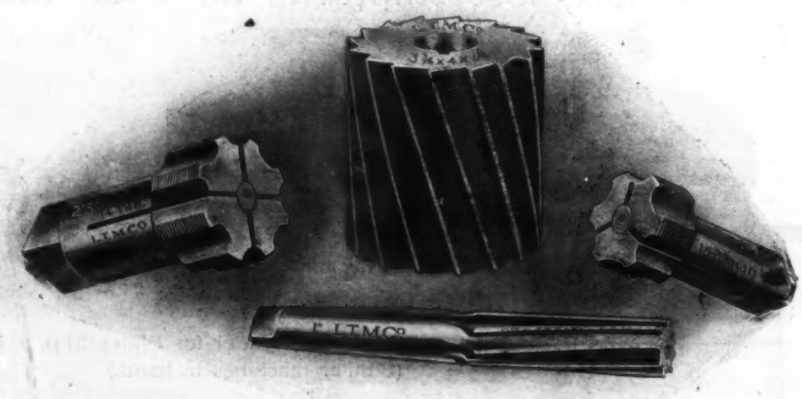

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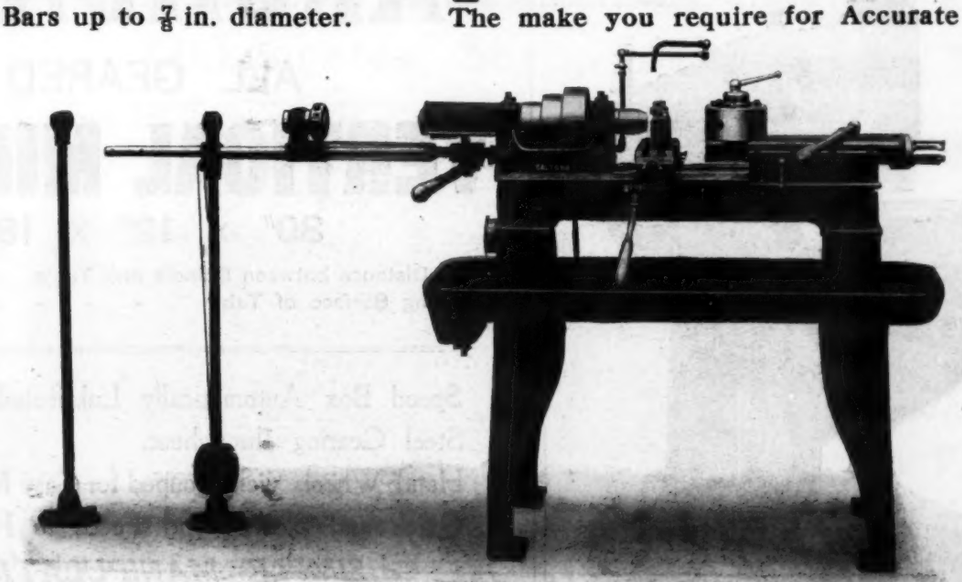

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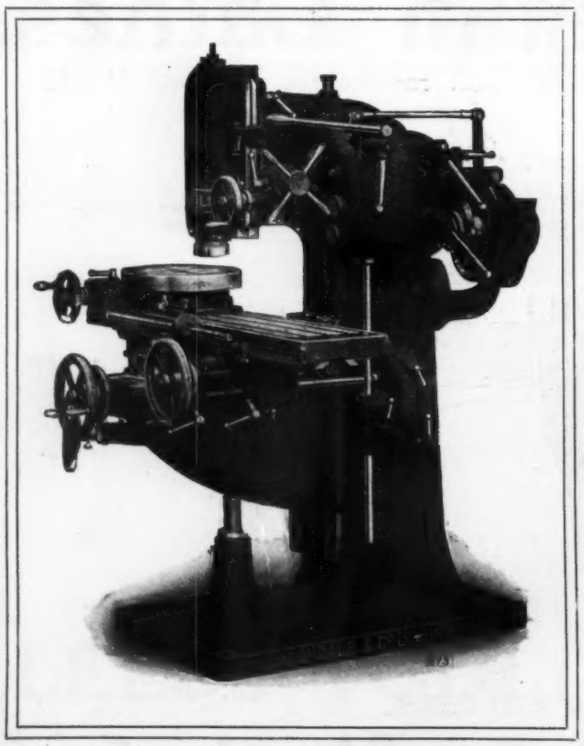

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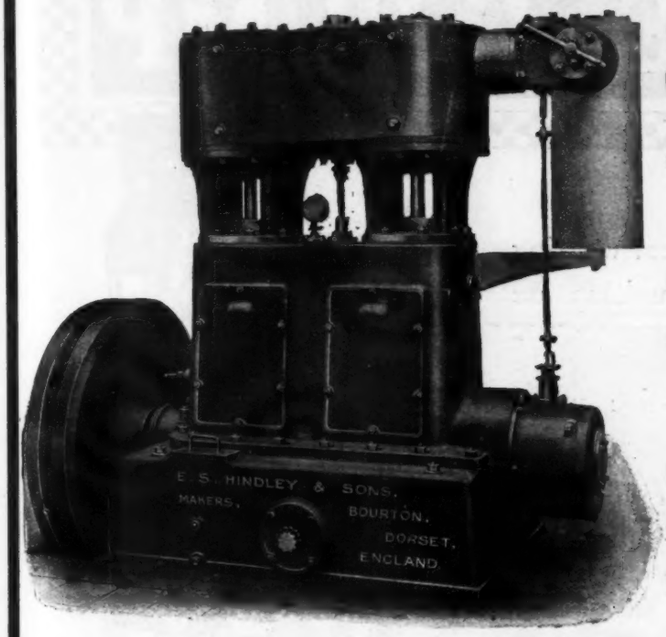

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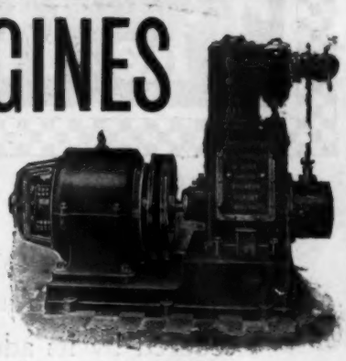

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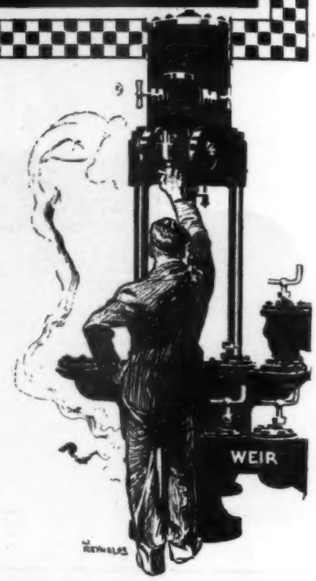

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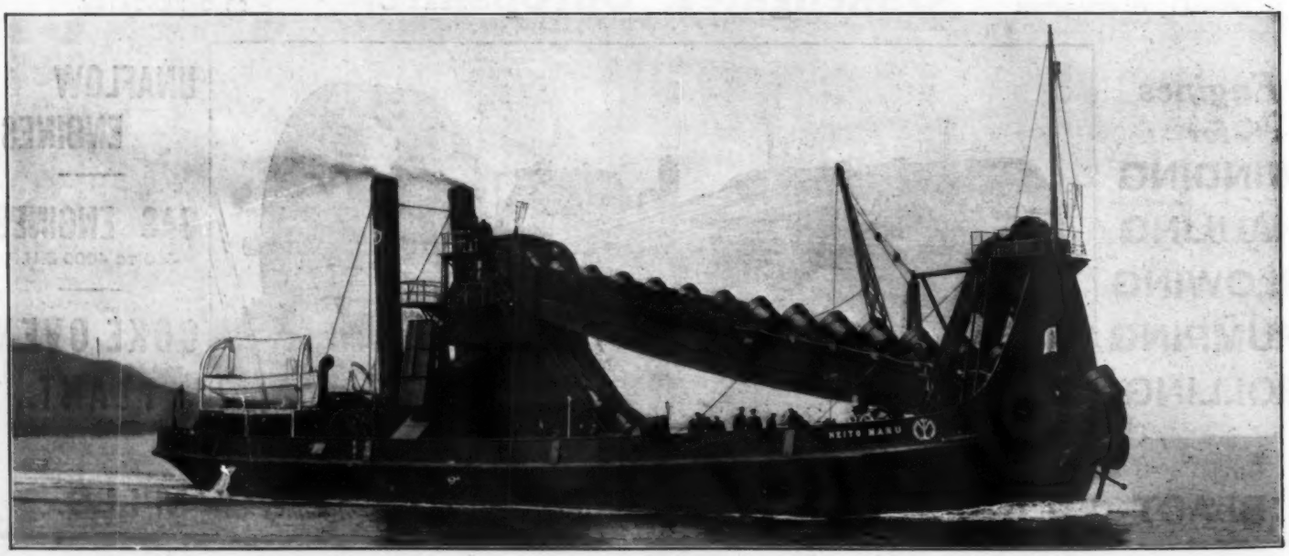

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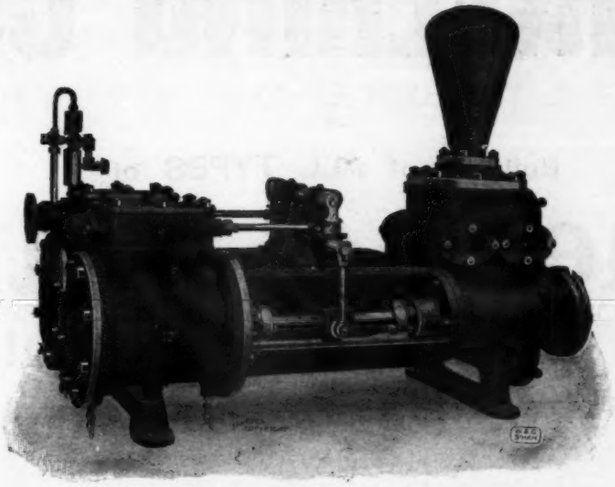

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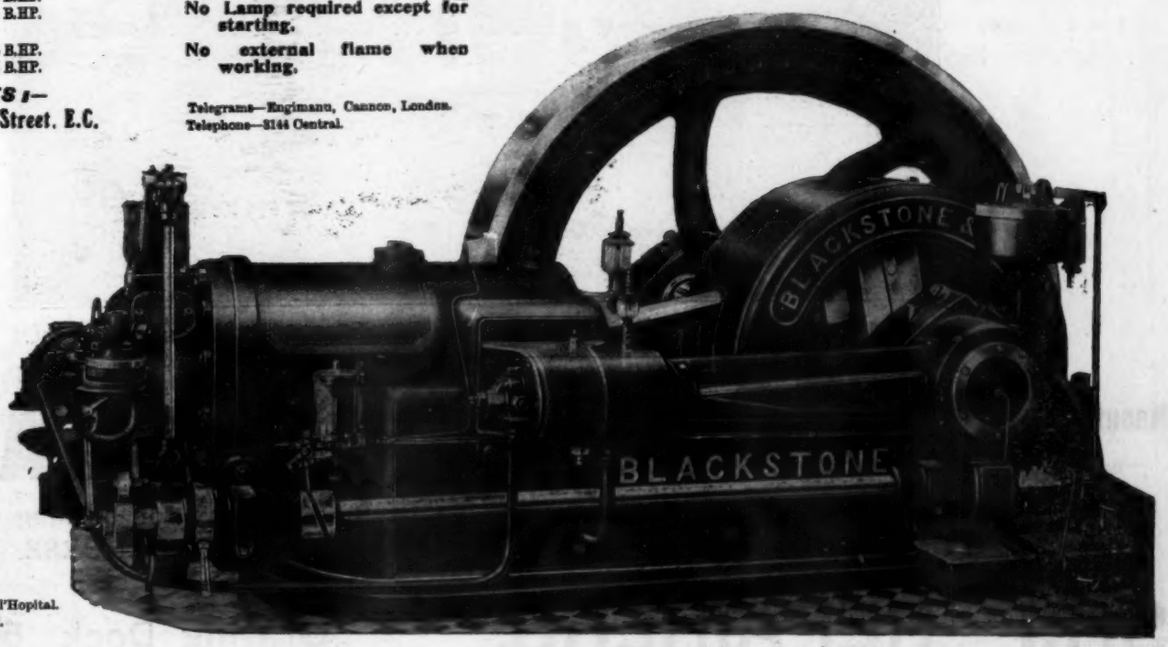

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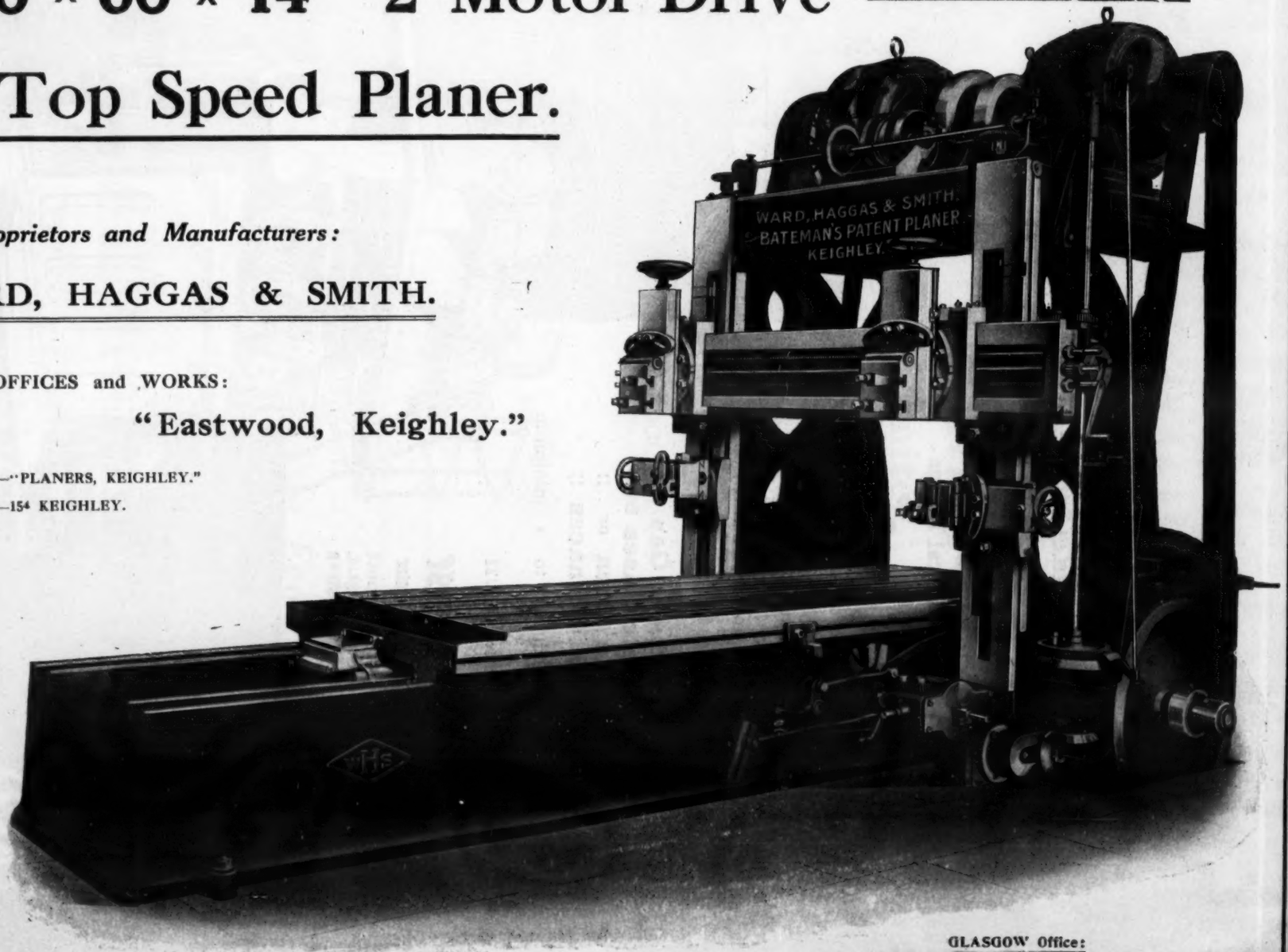

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Telephone—
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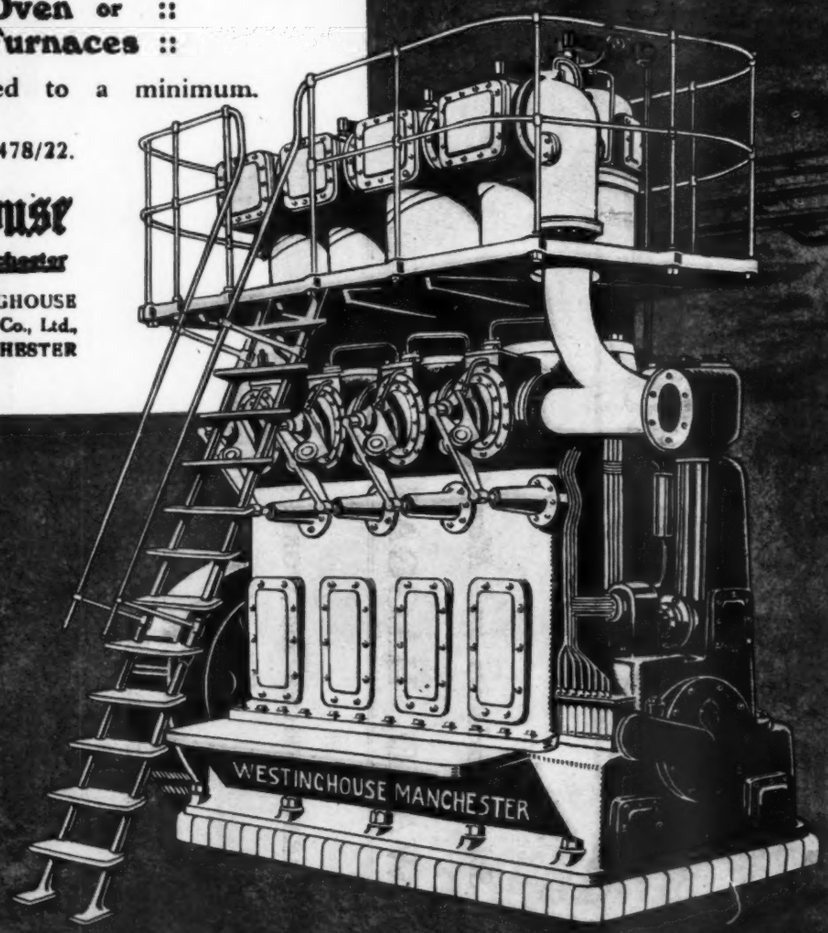

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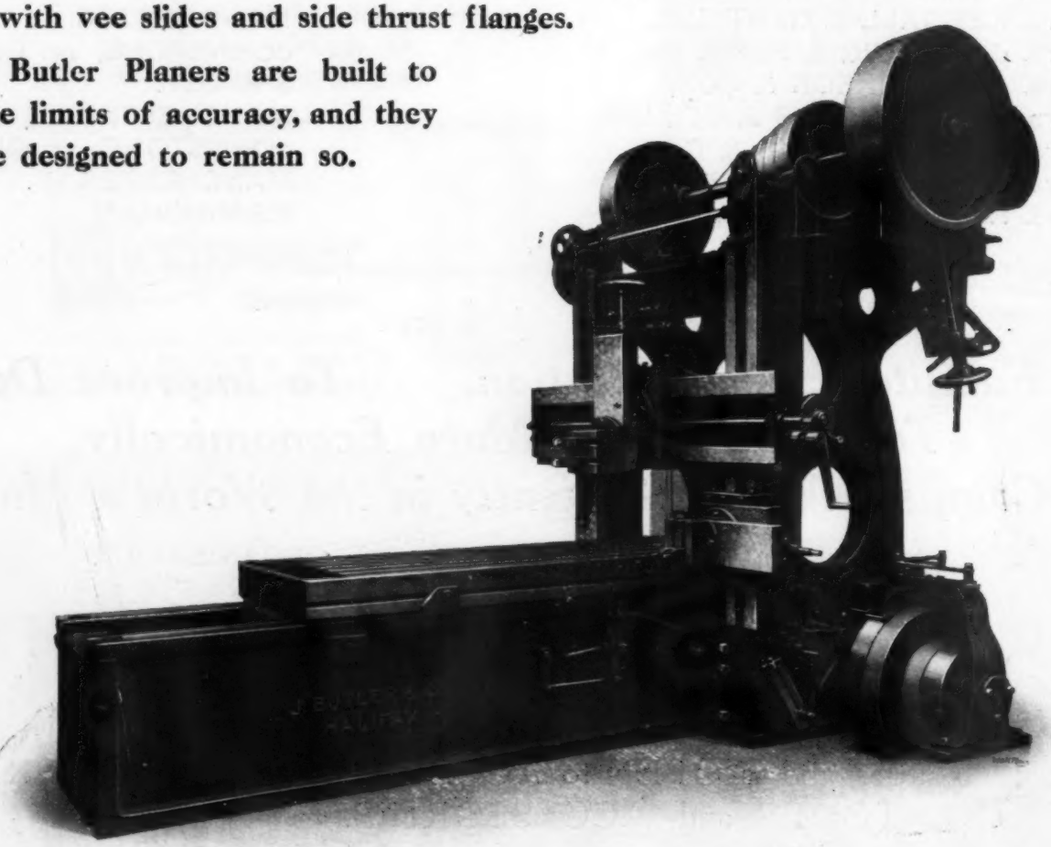

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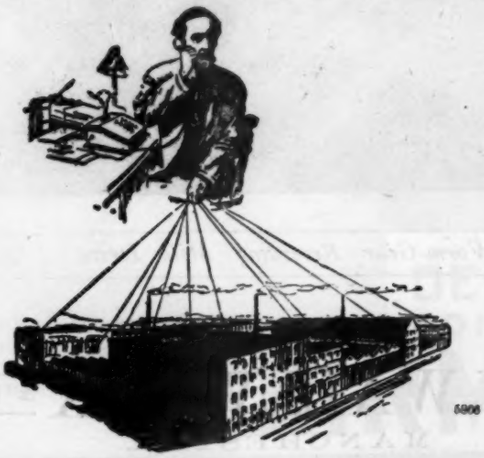

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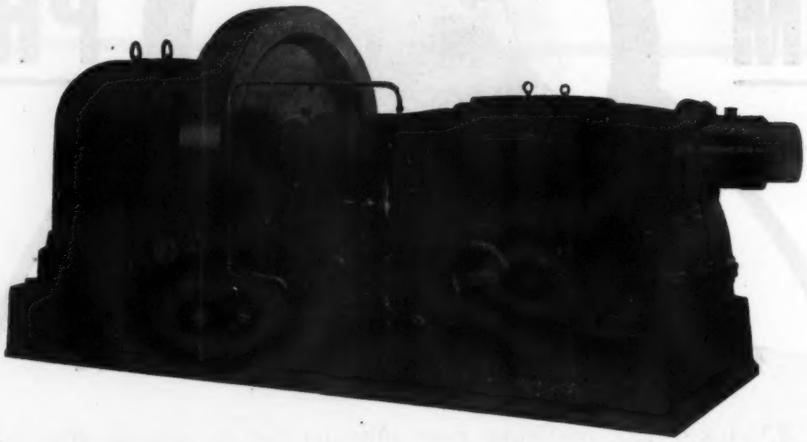

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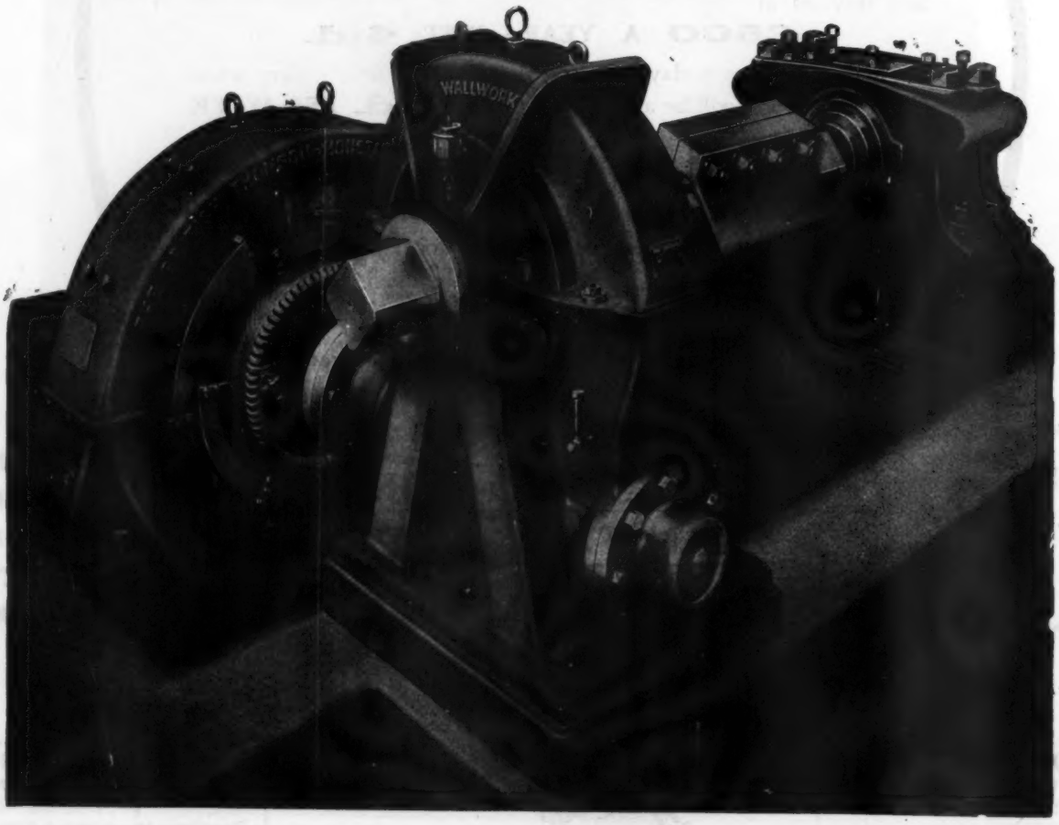

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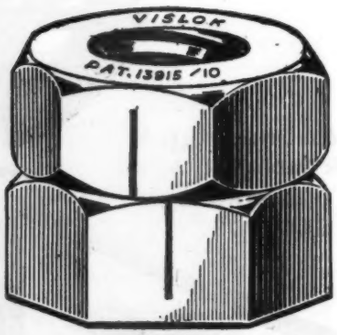

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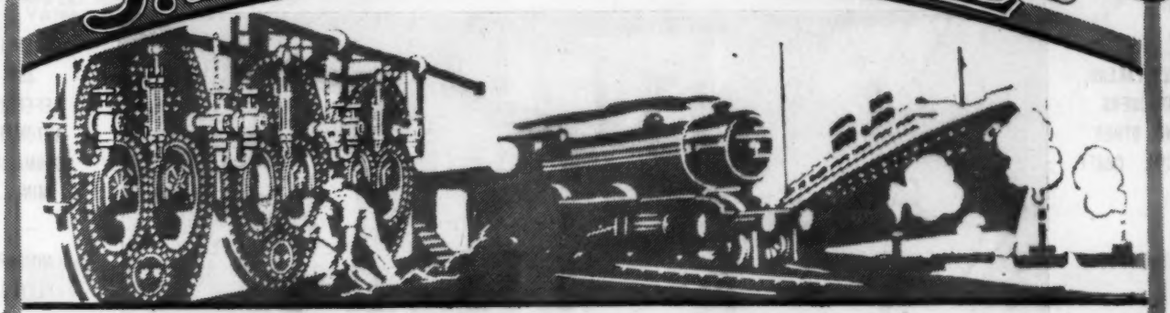

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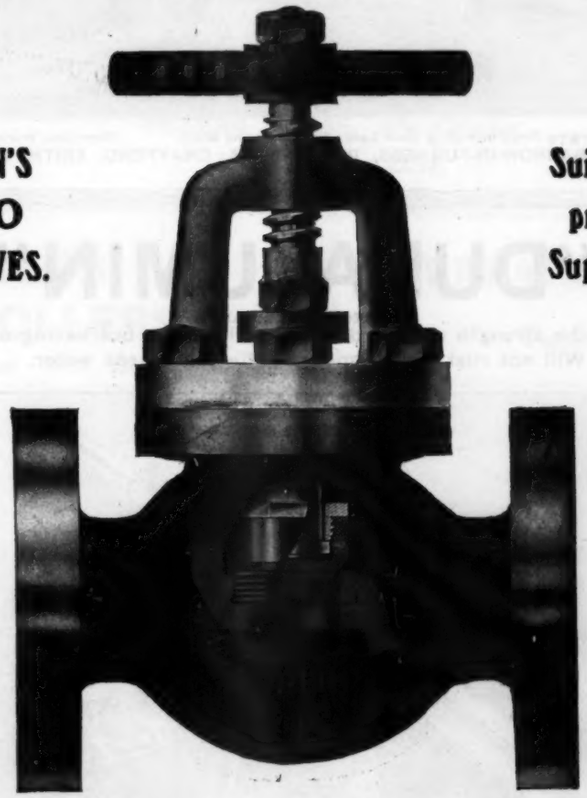

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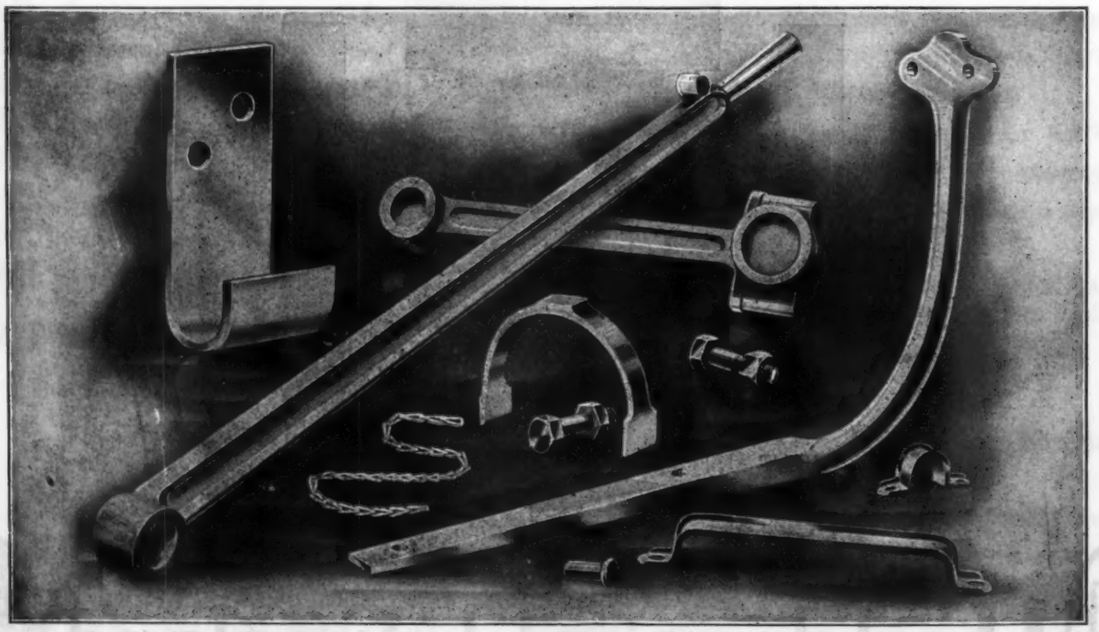

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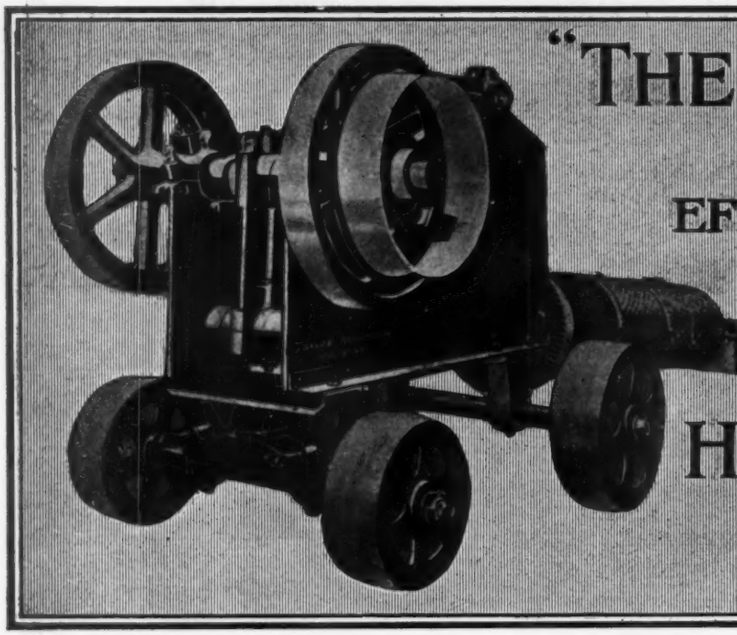

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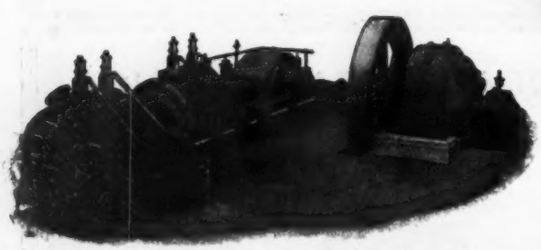

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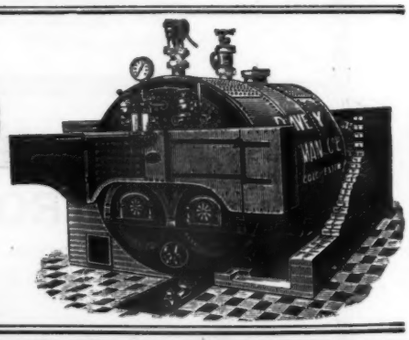

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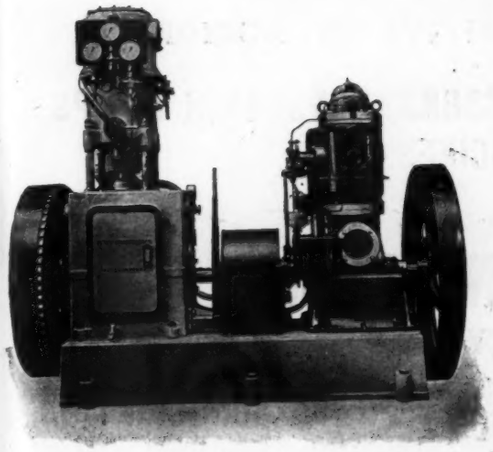

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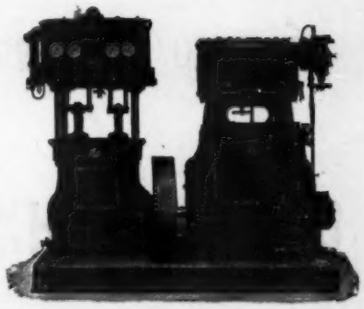

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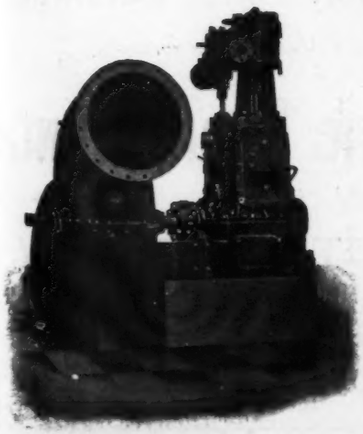

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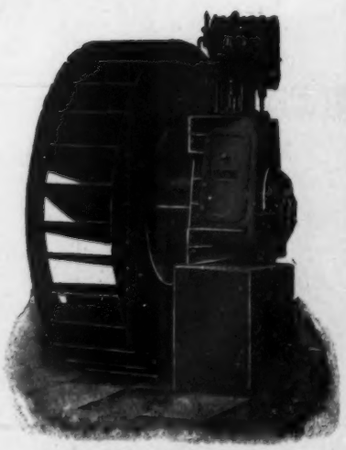

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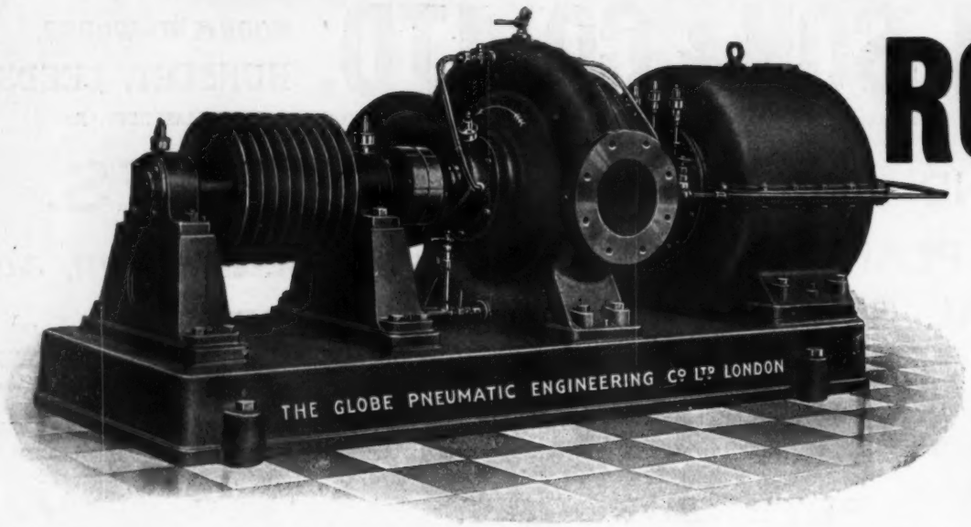

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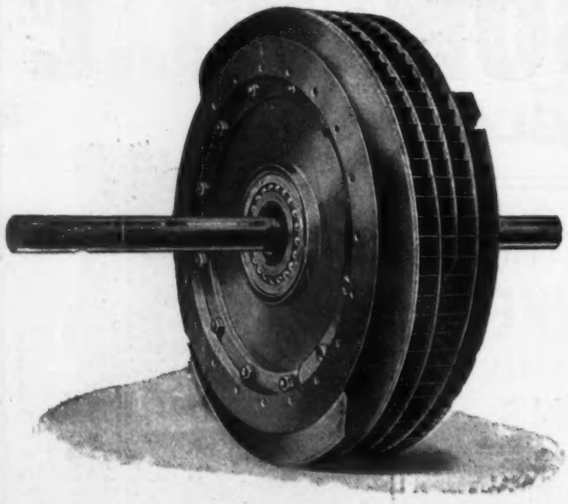

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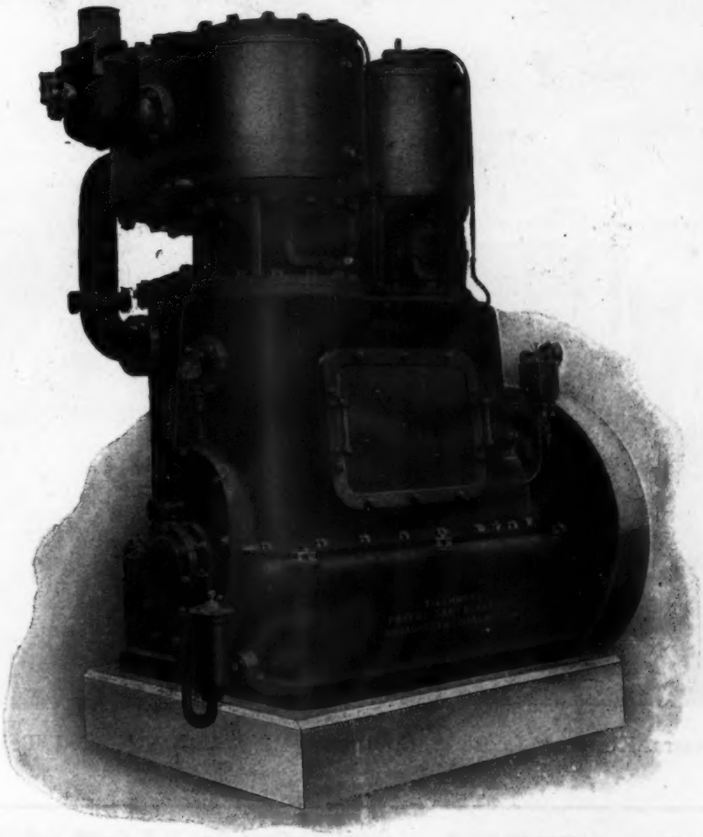

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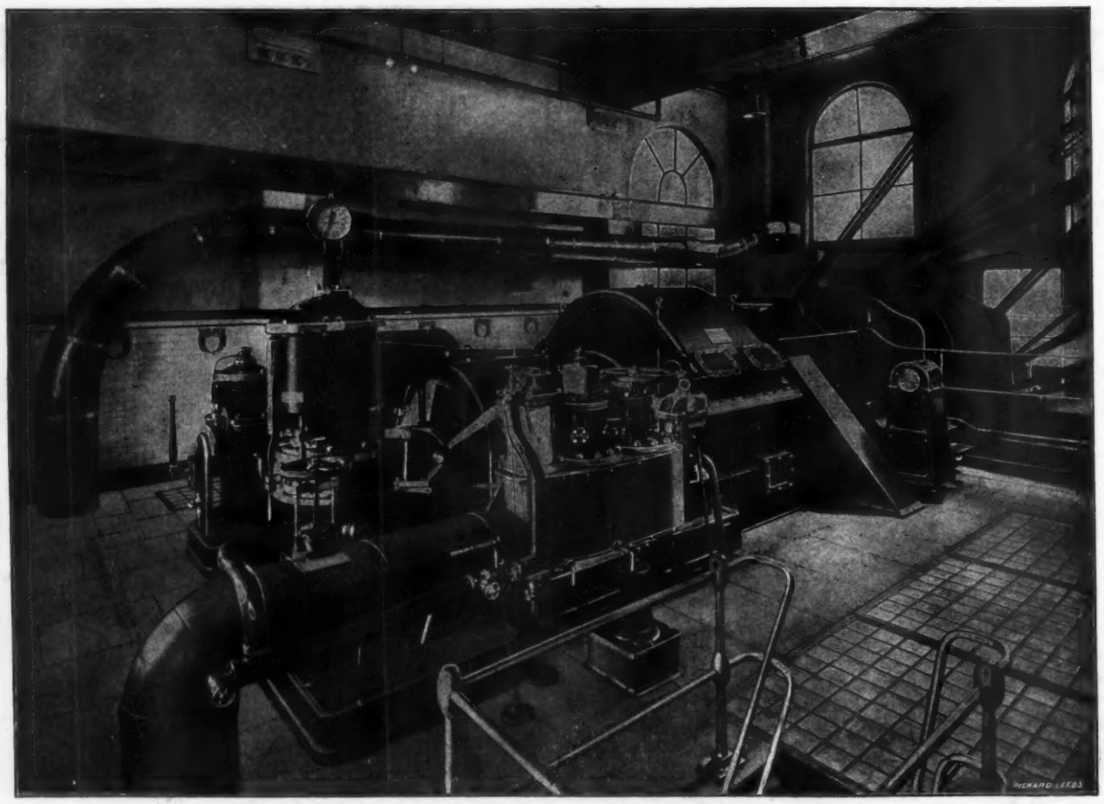

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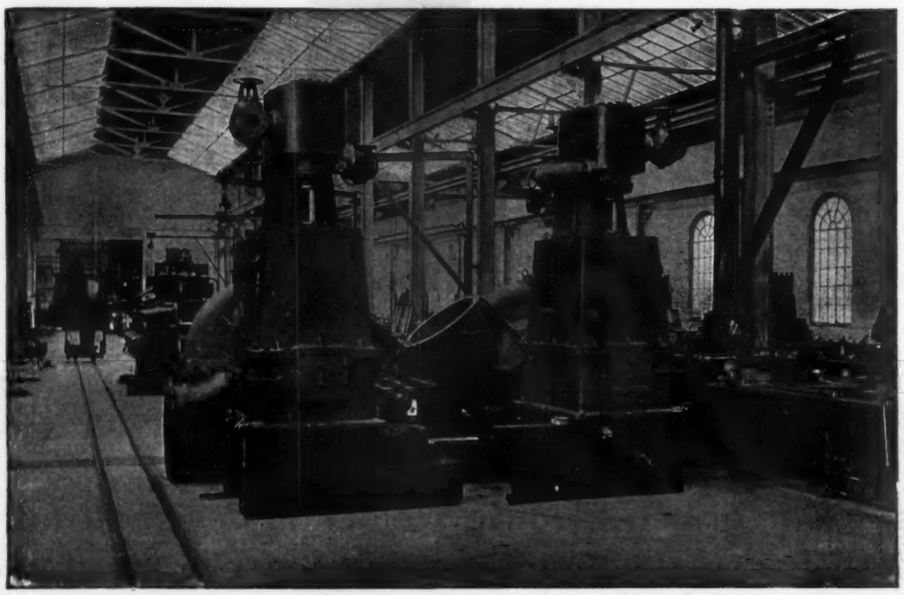

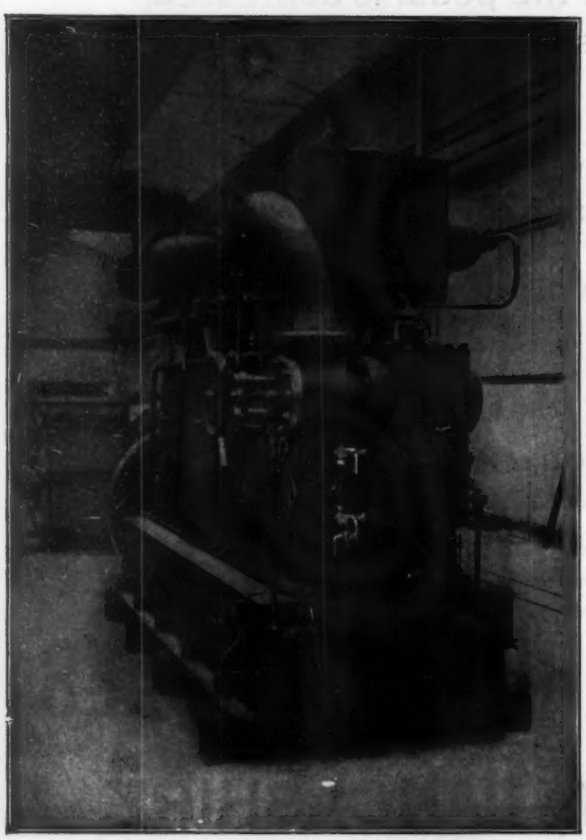

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Fig. 5017

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Fig. 5112.—TWIN PLUNGER PRESSURE PUMP.
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Fig. 5008

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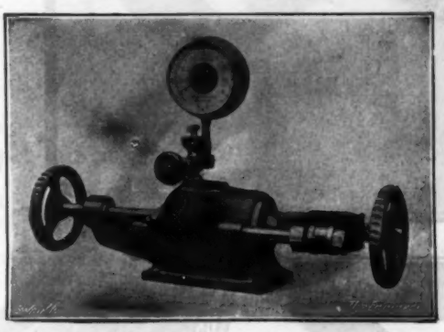

Fig. 5068.—STER-HYDRAULIC CRUSHING TESTER.
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Fig. 5062

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Fig. 5106.—PRESSURE and VACUUM GAUGE TESTER.
Fig. 5105.—Ditto, without Cabinet.

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Fig. 5067

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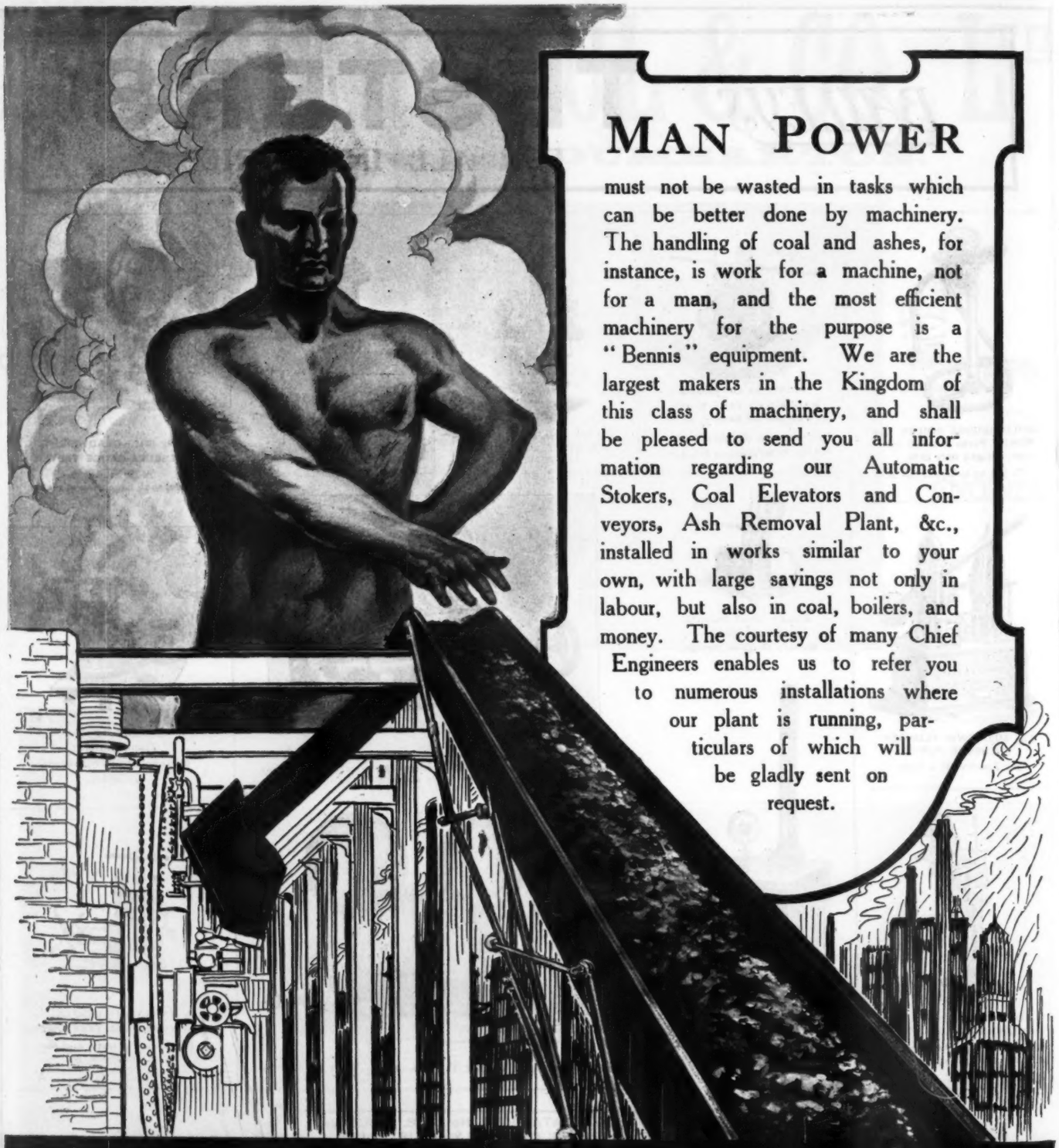

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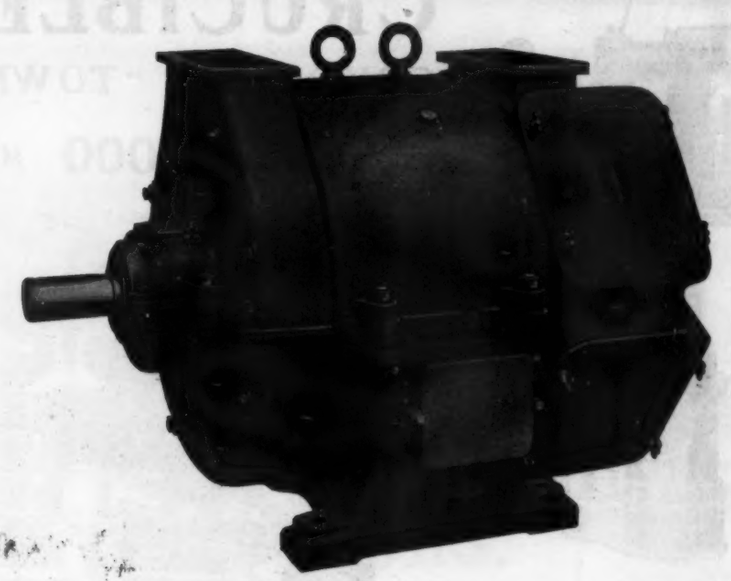

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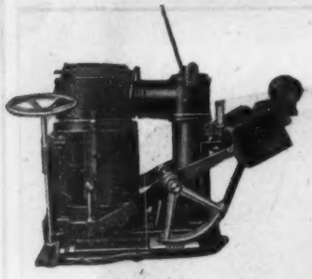

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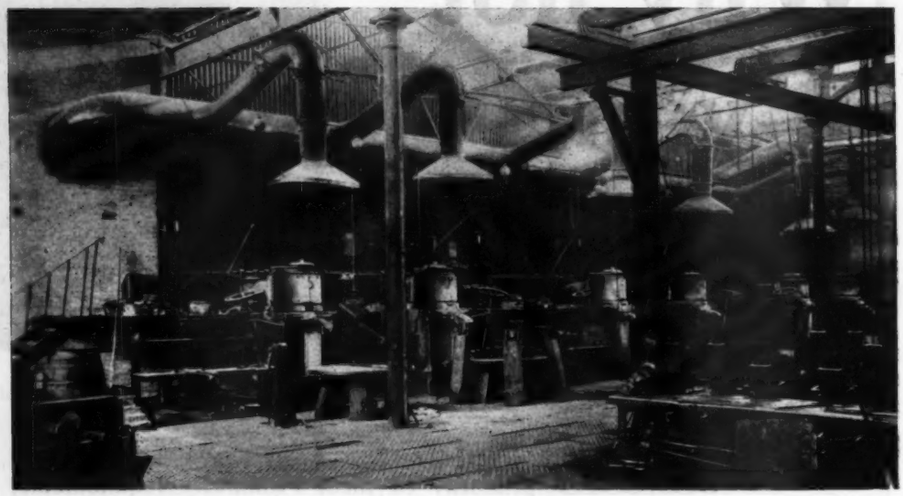

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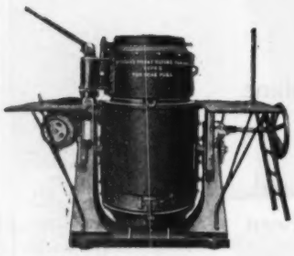

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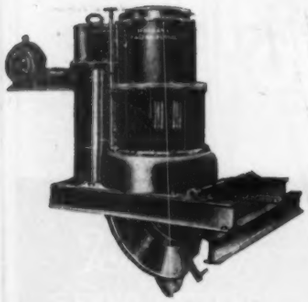

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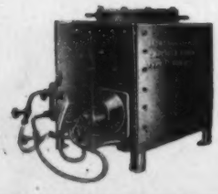

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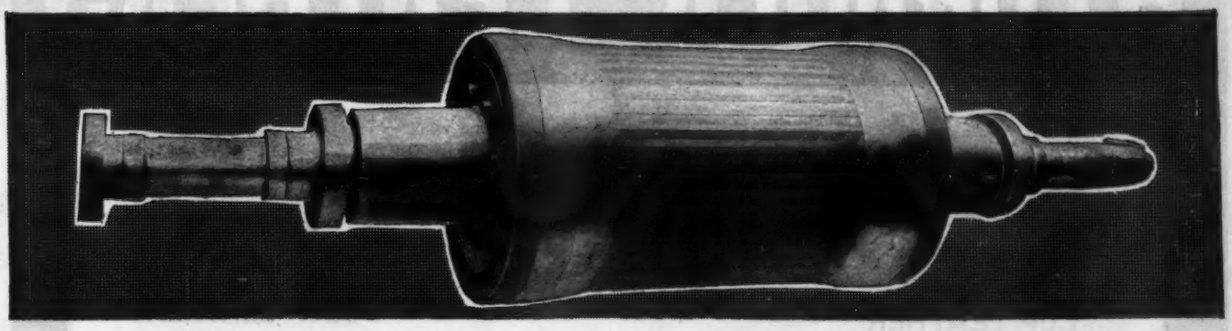

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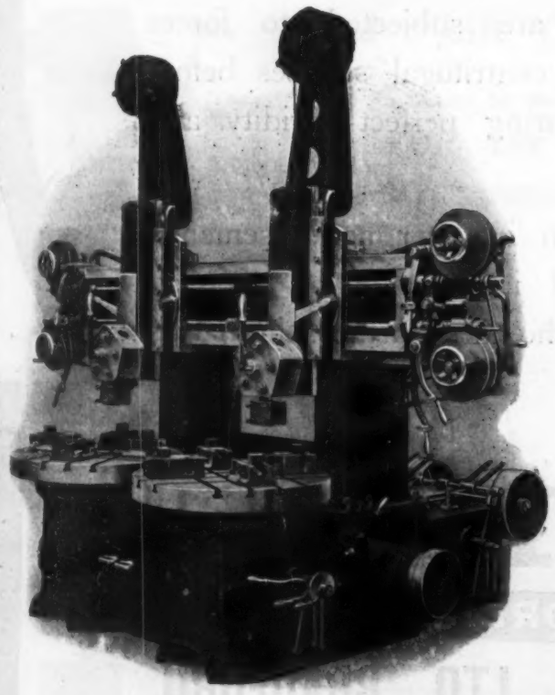

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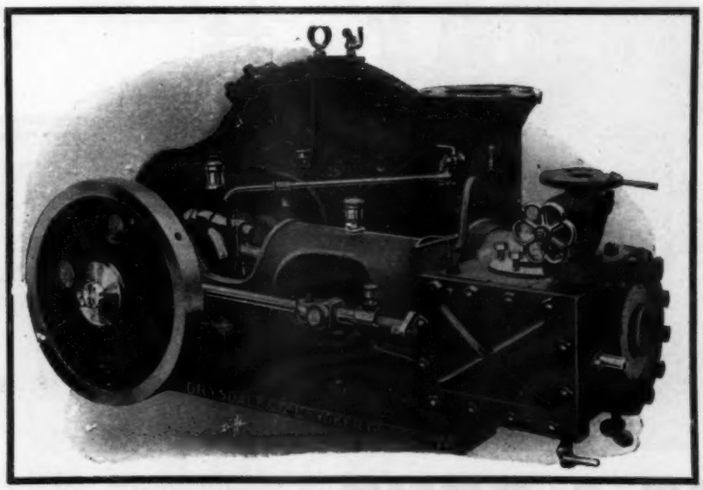

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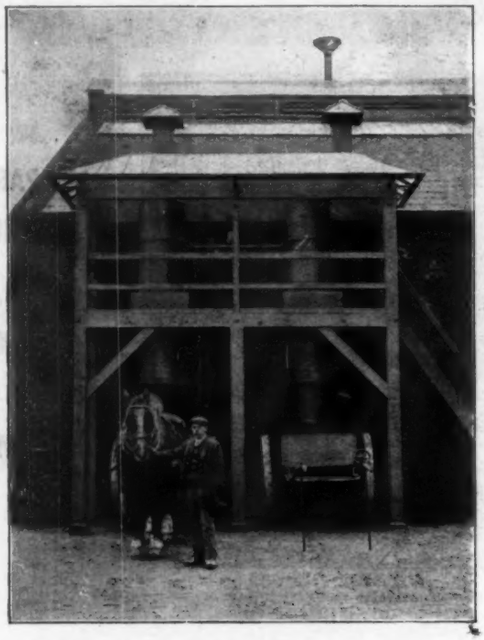

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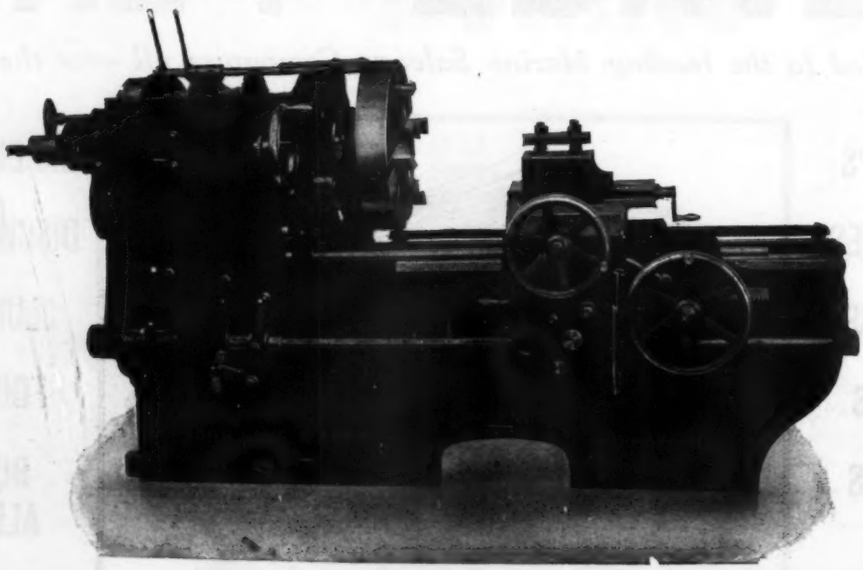

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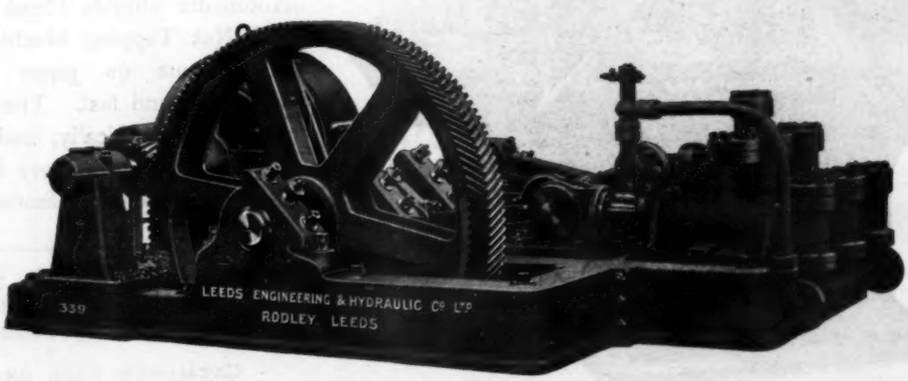

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5296

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5282

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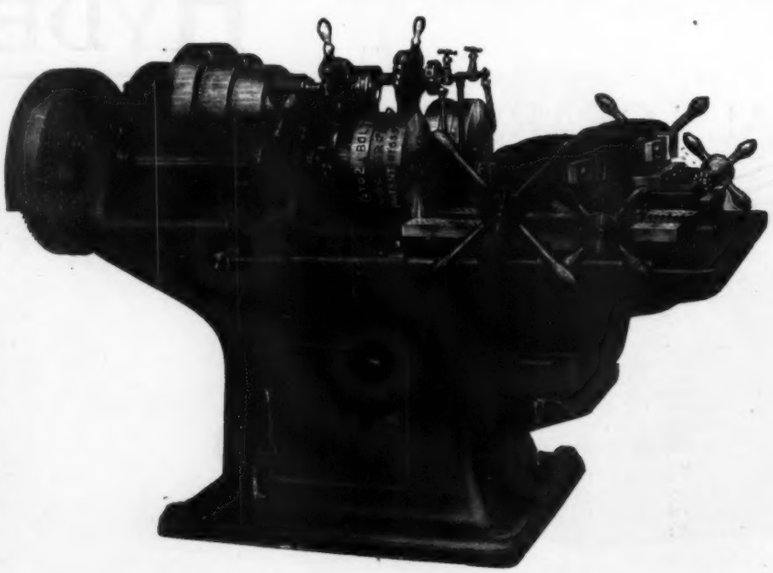

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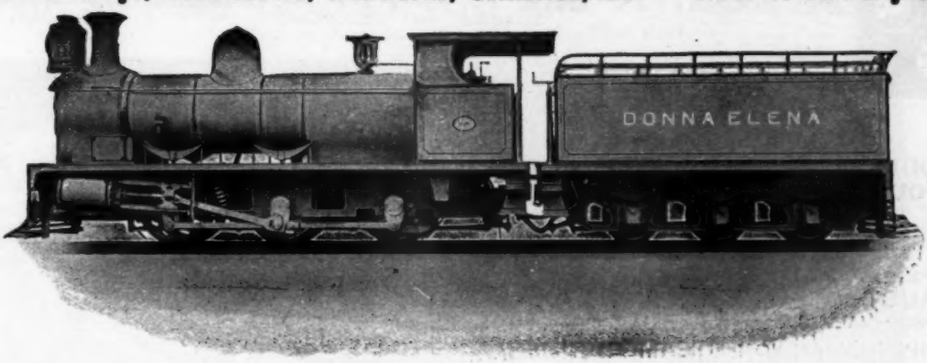

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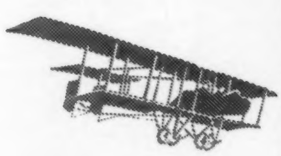

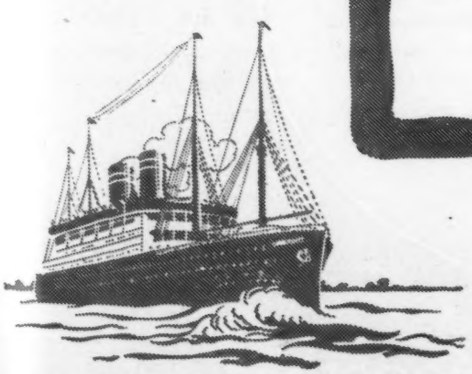

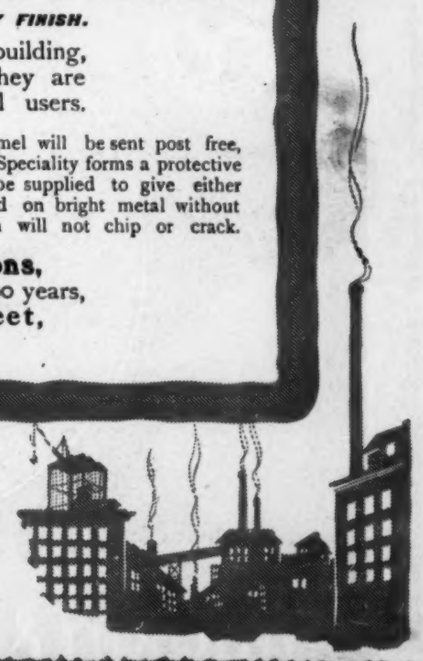

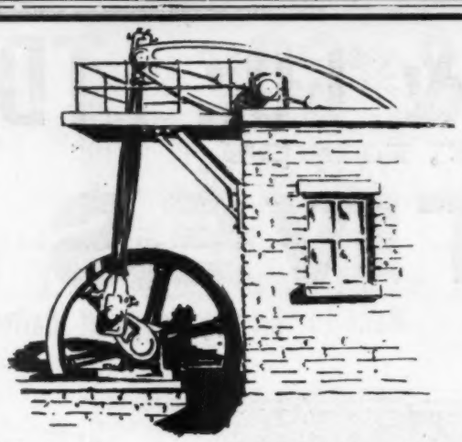

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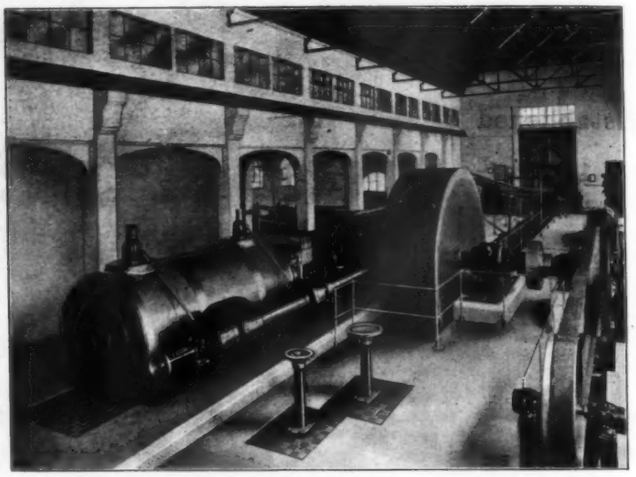

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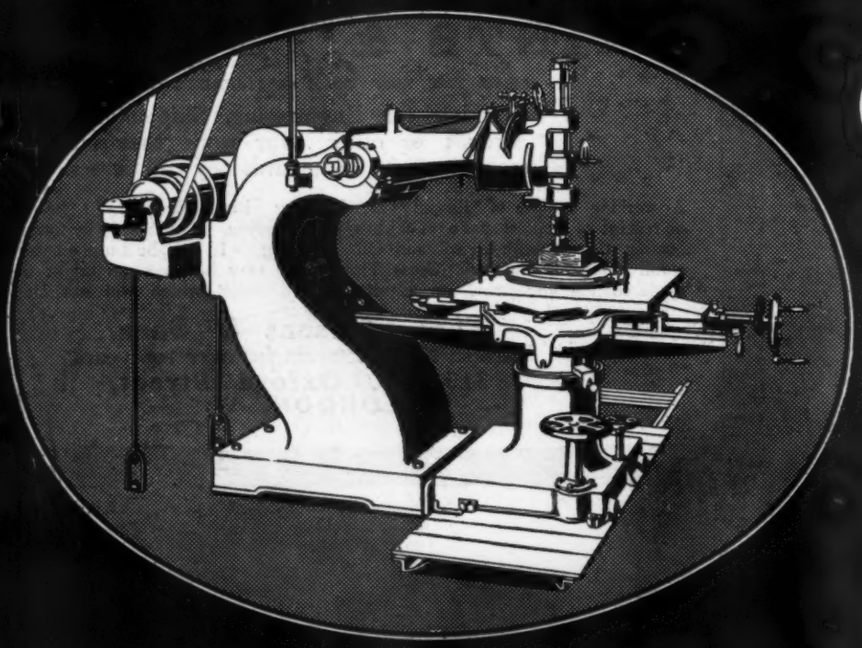

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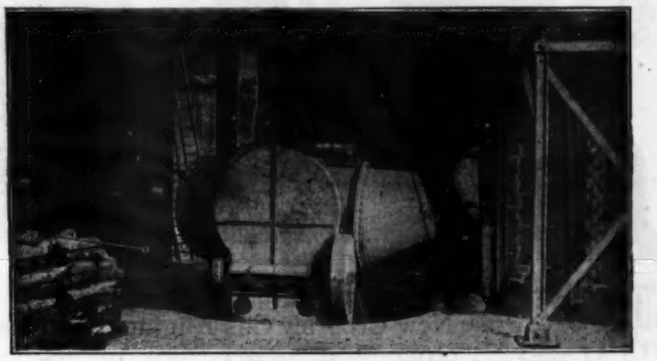

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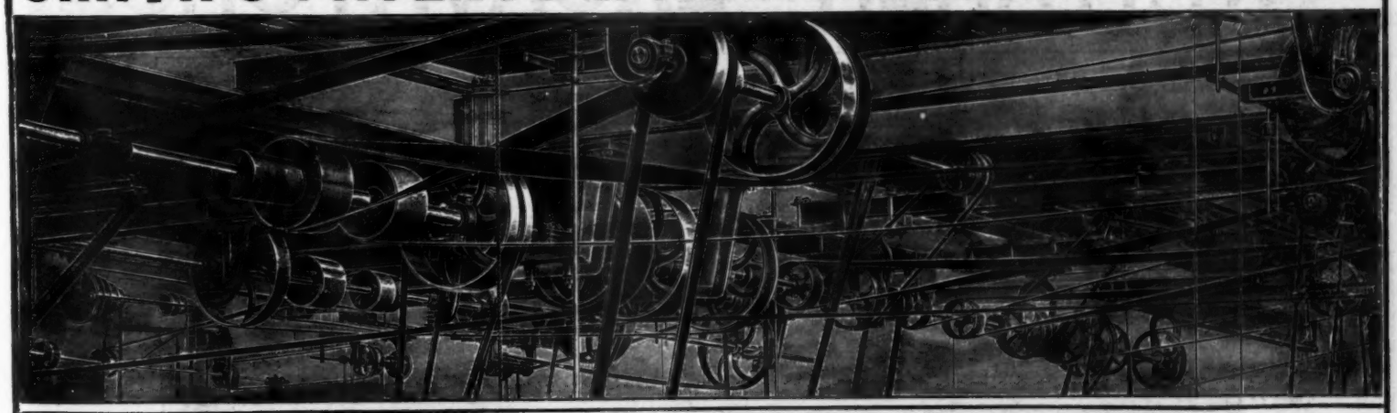

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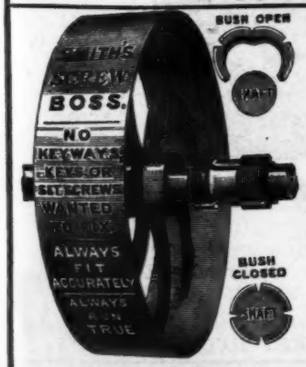

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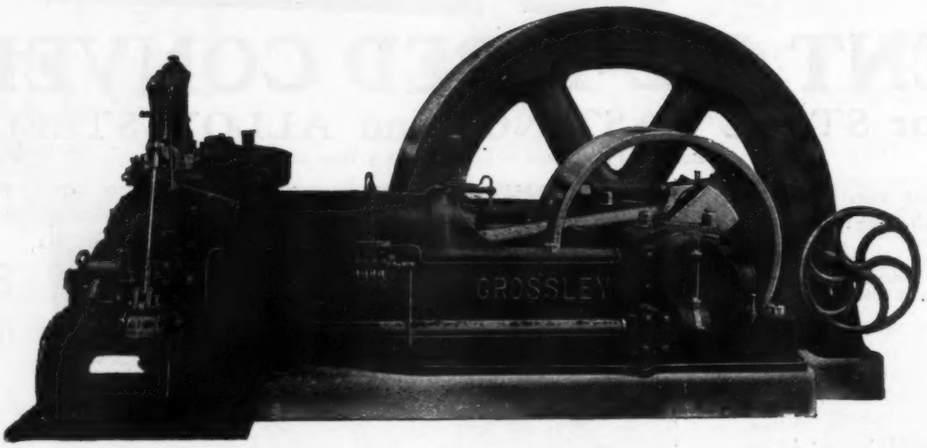

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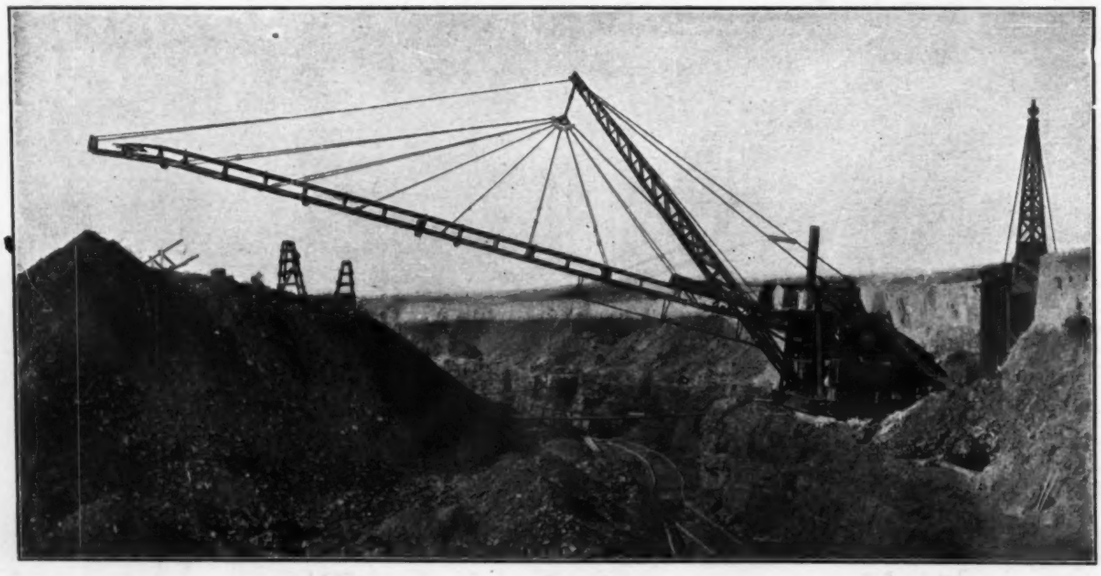

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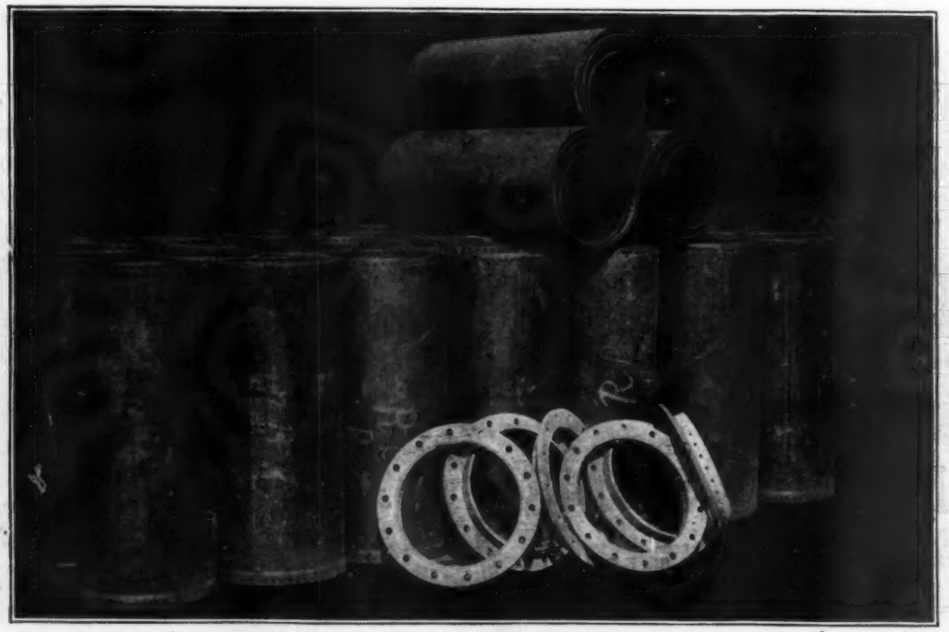

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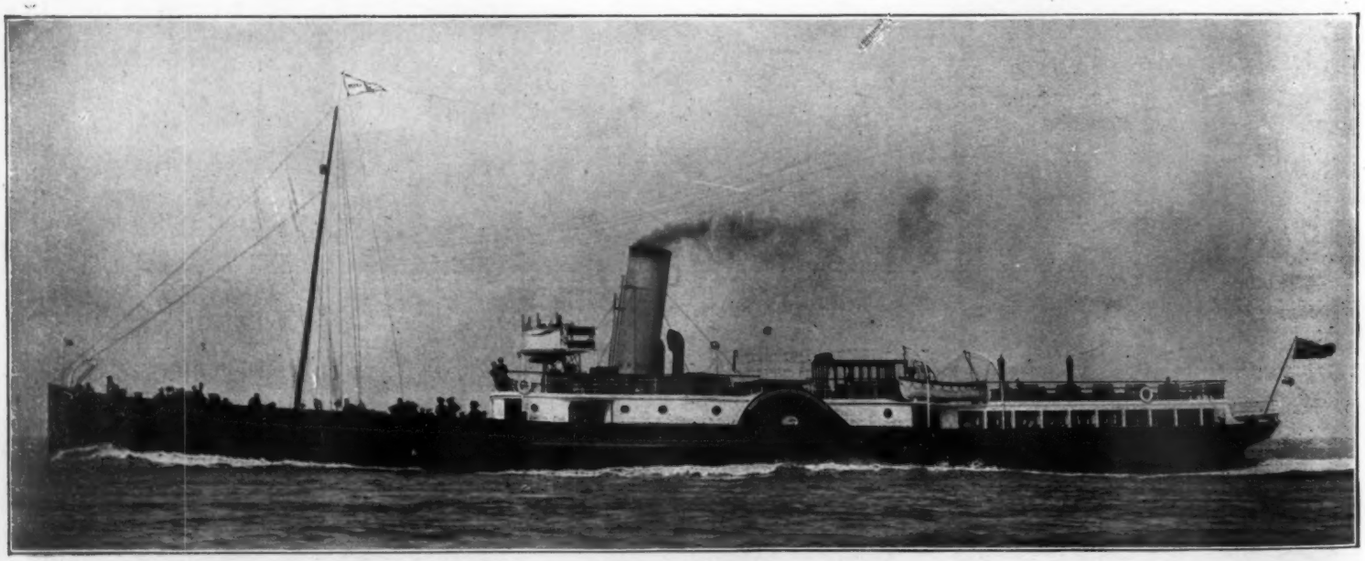

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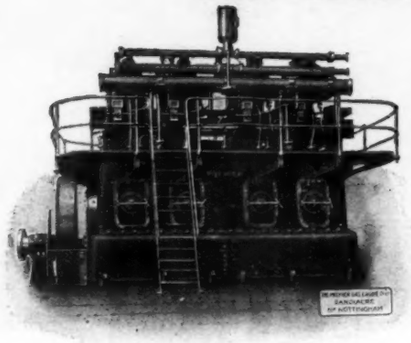

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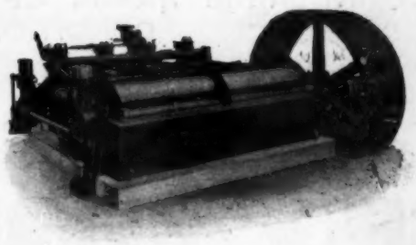

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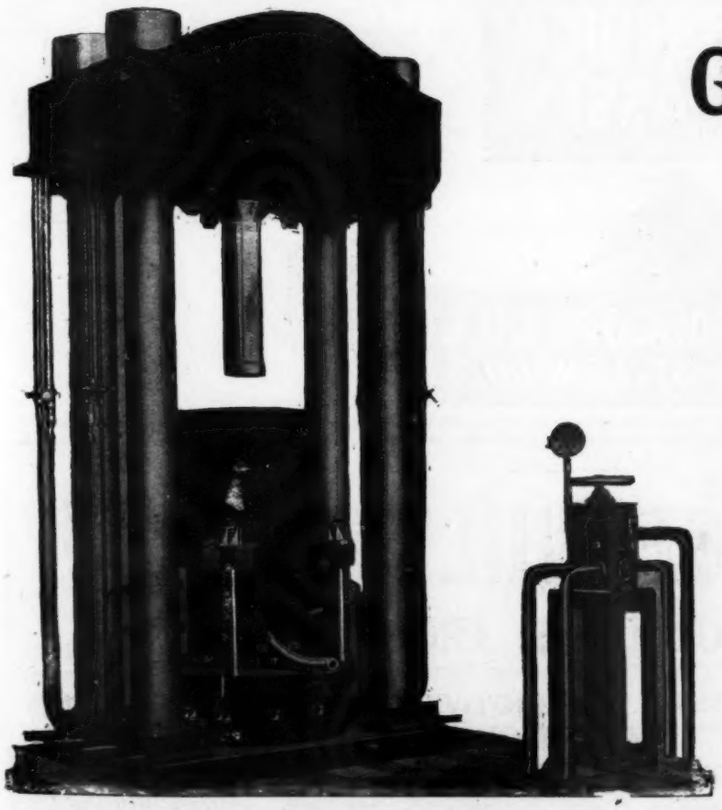

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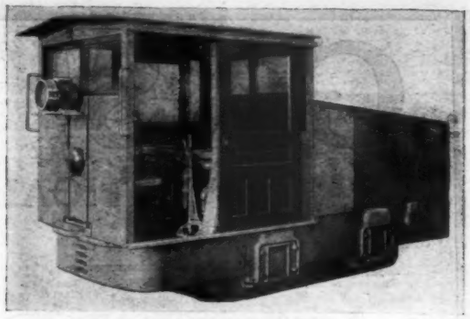

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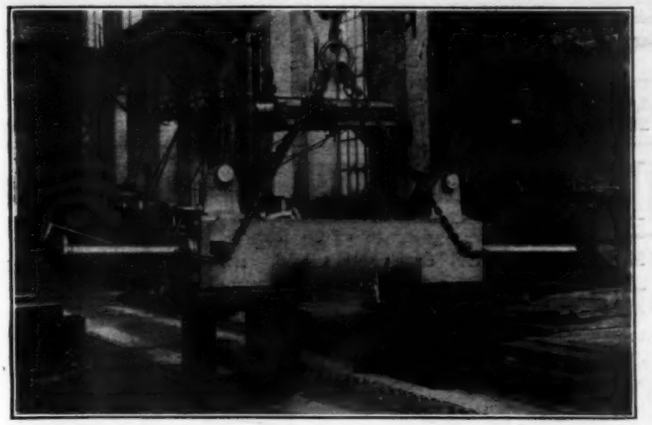

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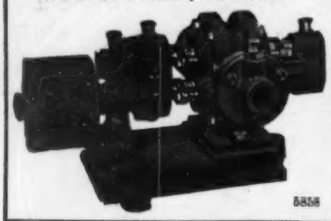

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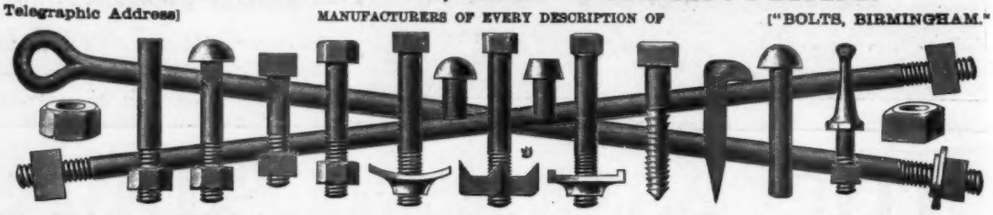

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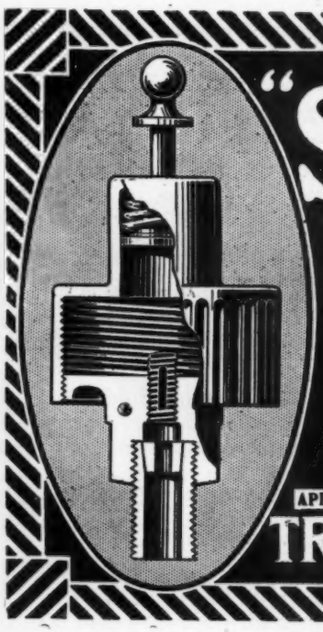

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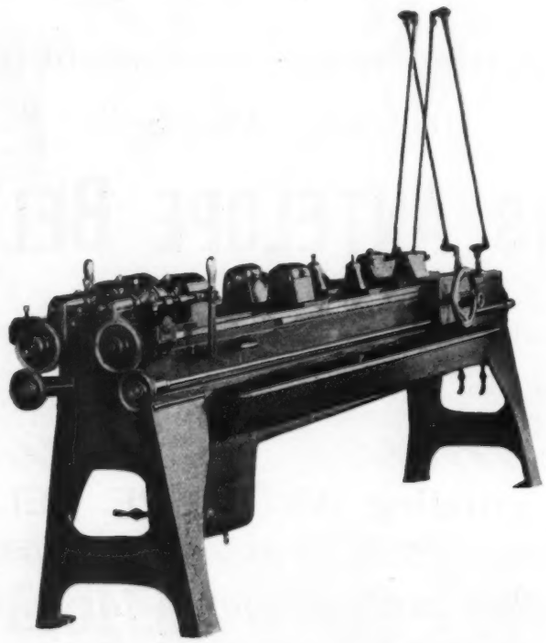

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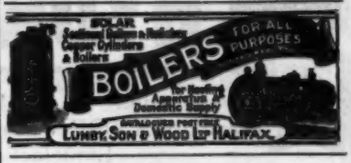

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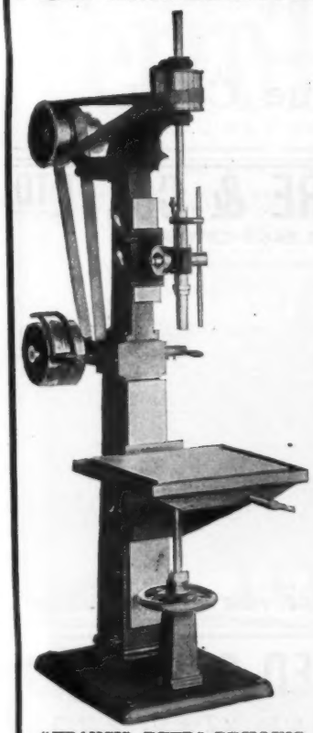

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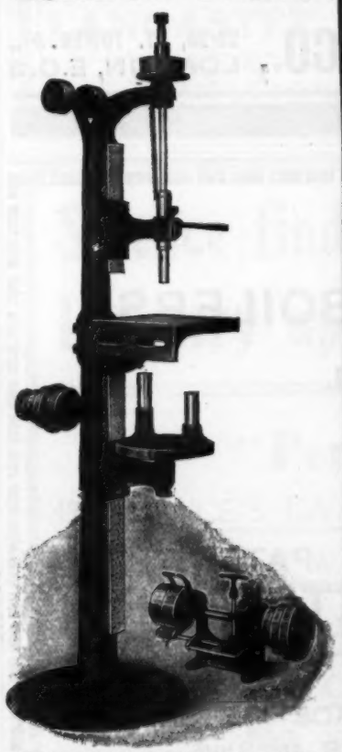

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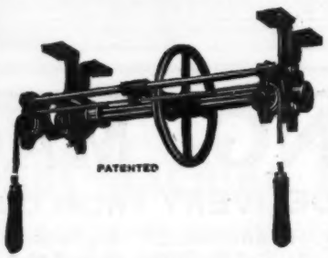

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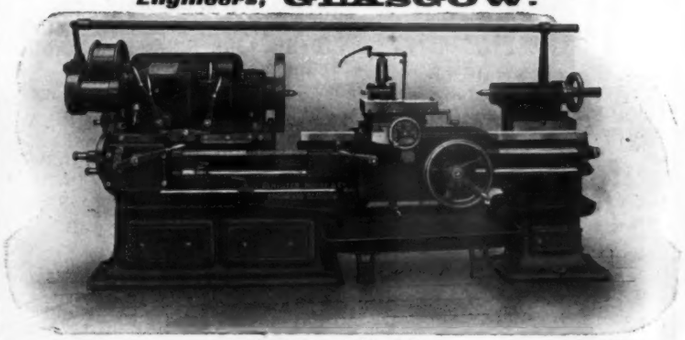
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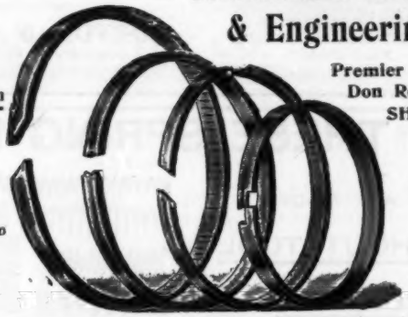

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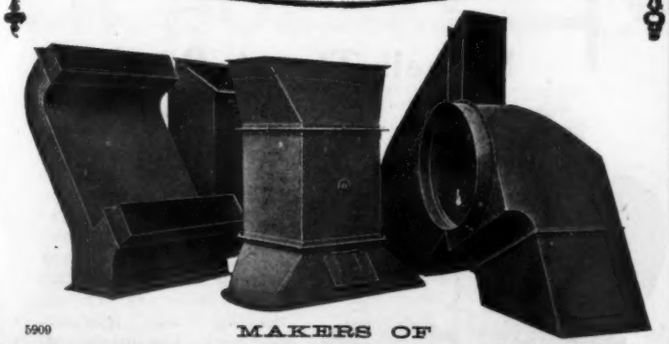

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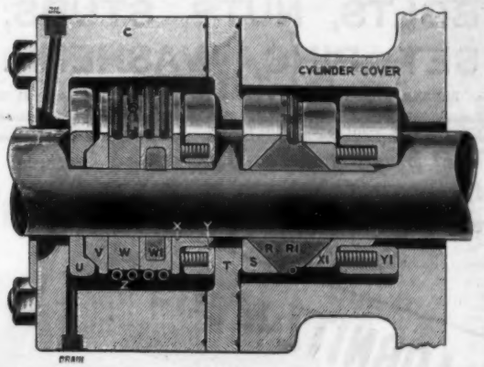

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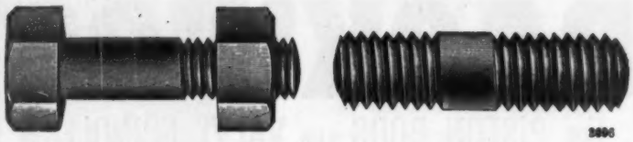

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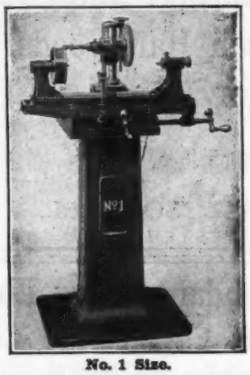

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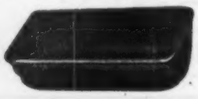

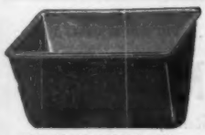

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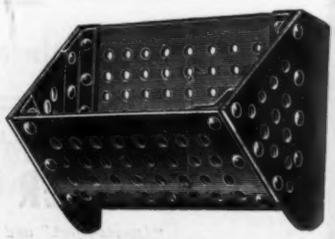

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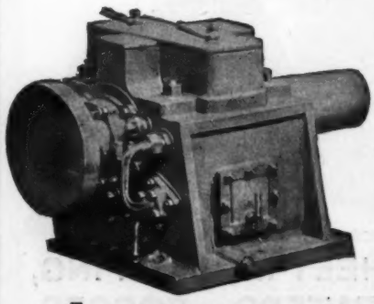

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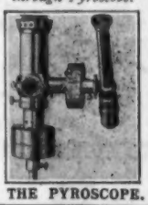

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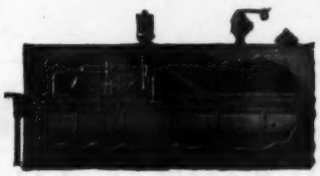

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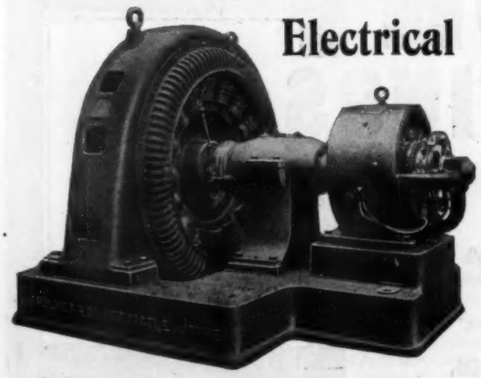

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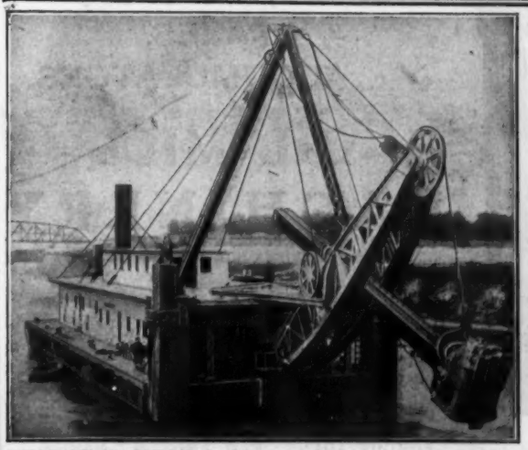

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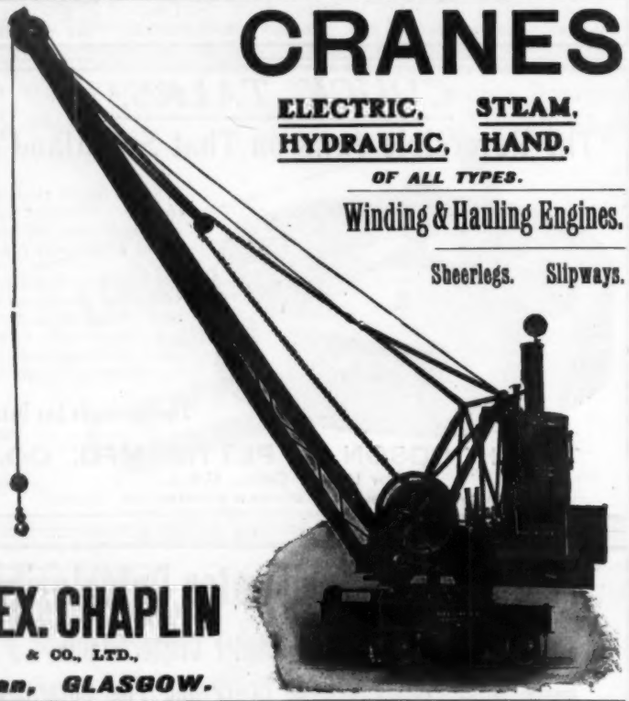

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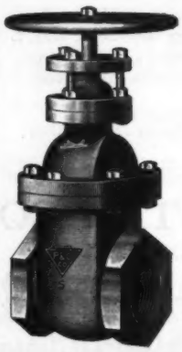

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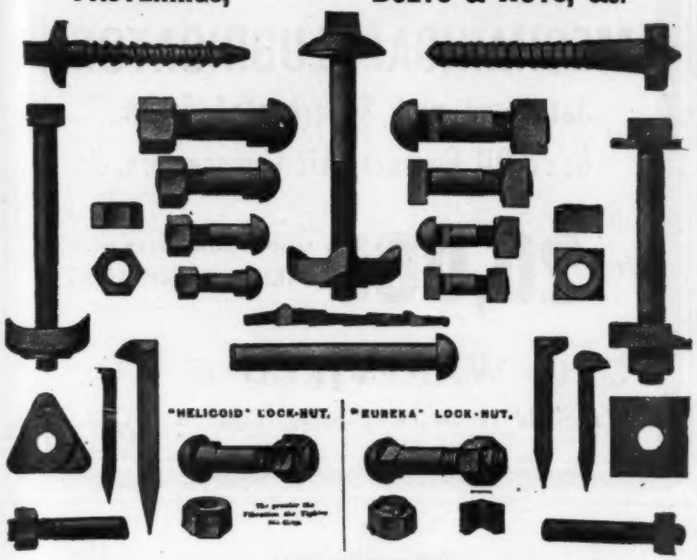

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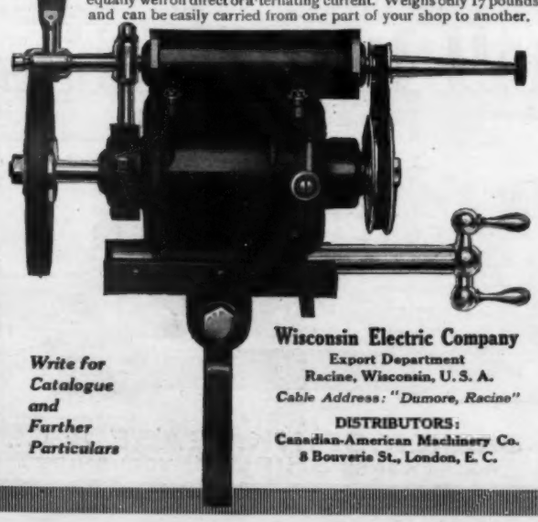

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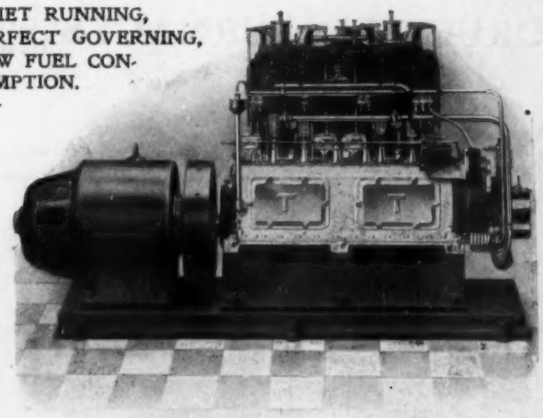

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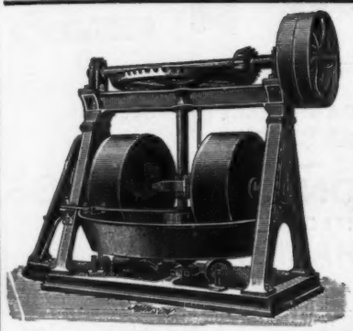

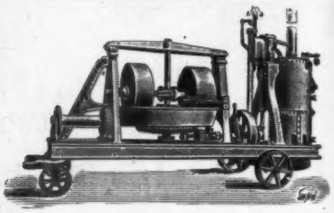

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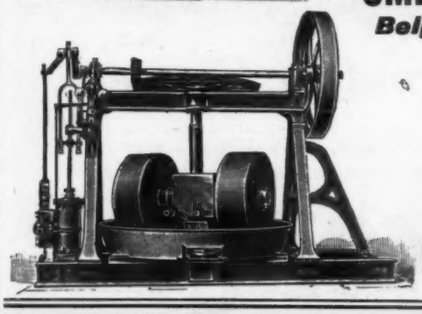

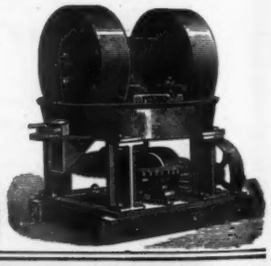

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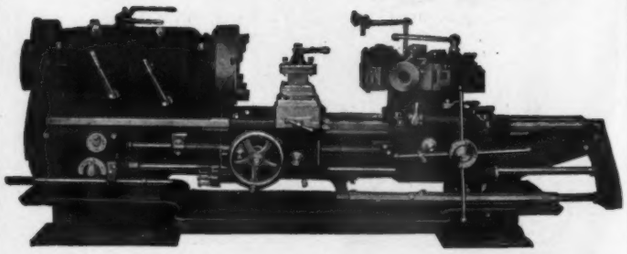

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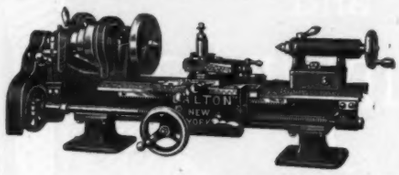

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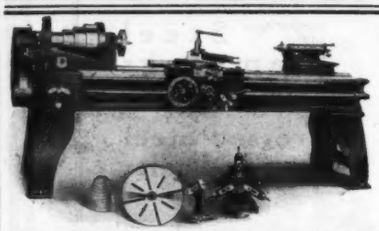

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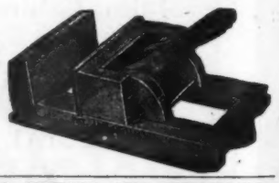

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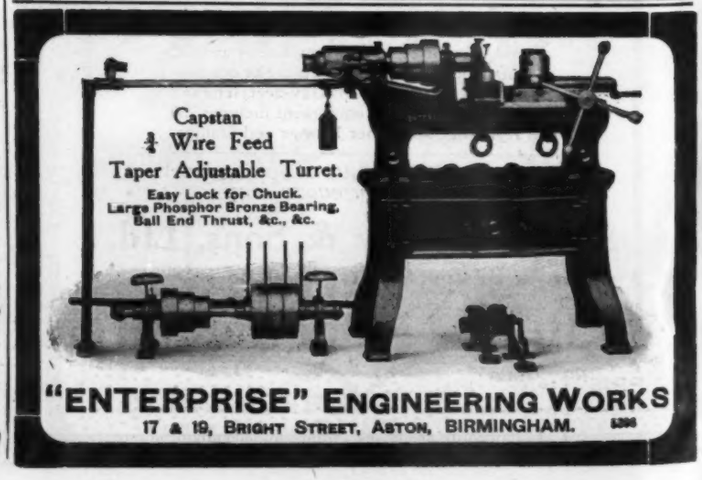

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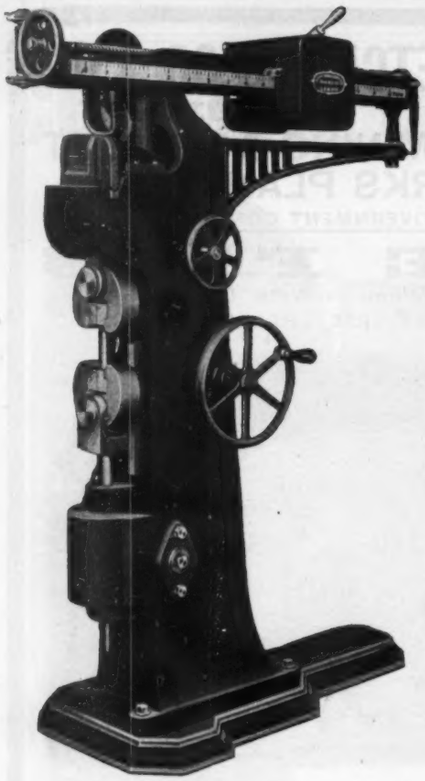

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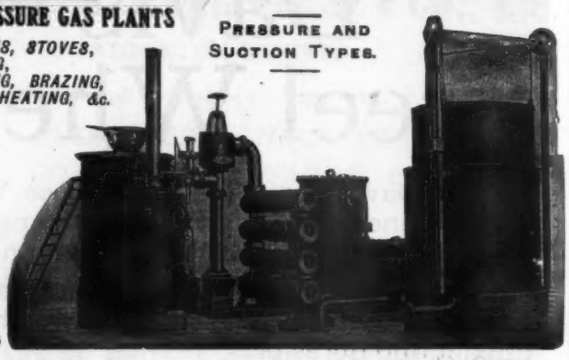

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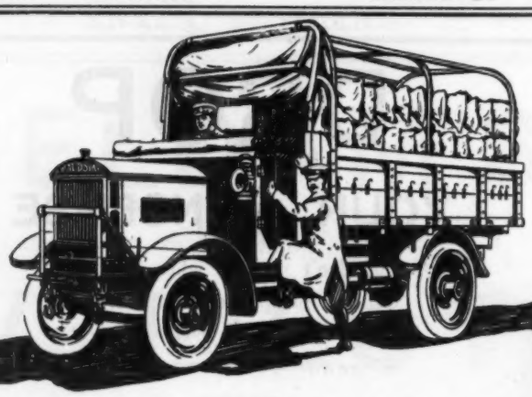

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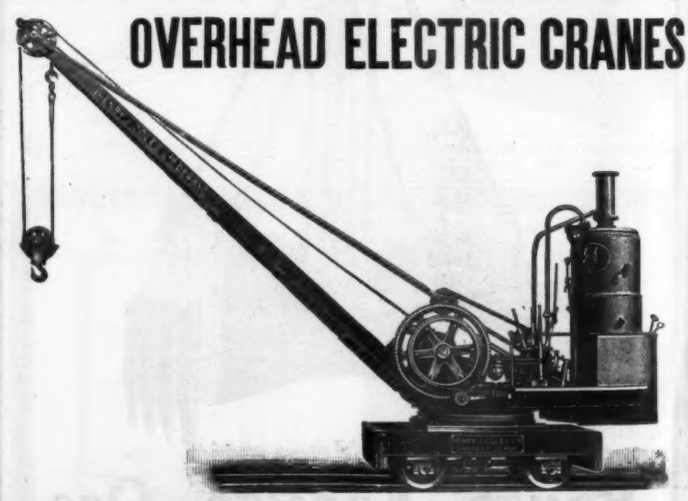

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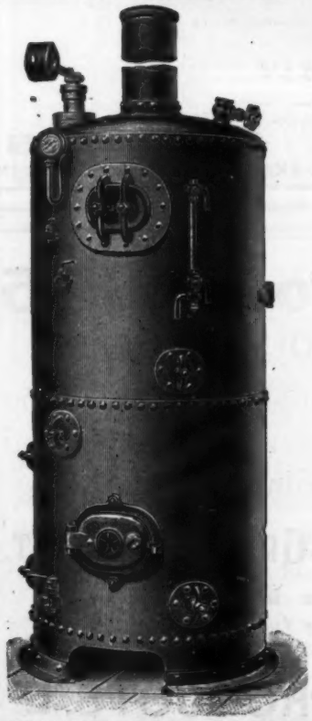

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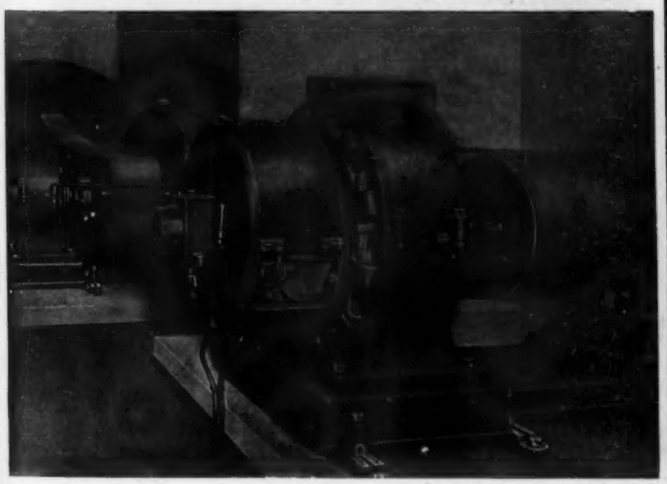

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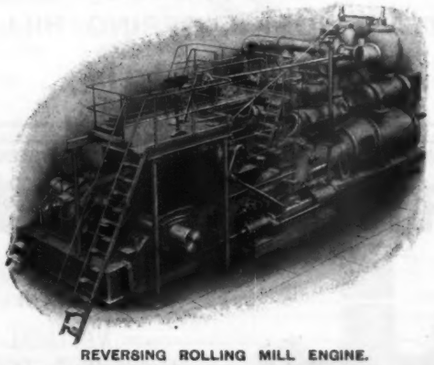

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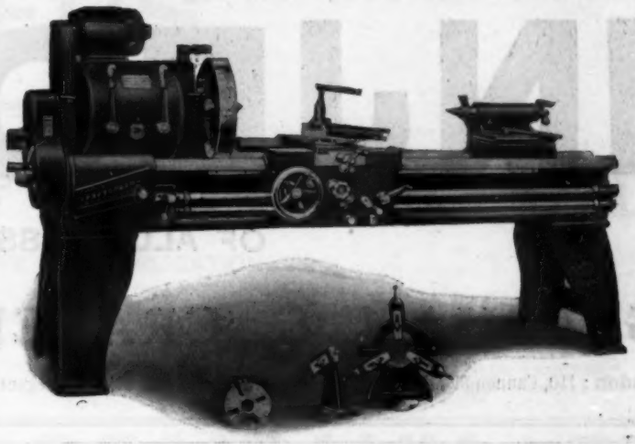

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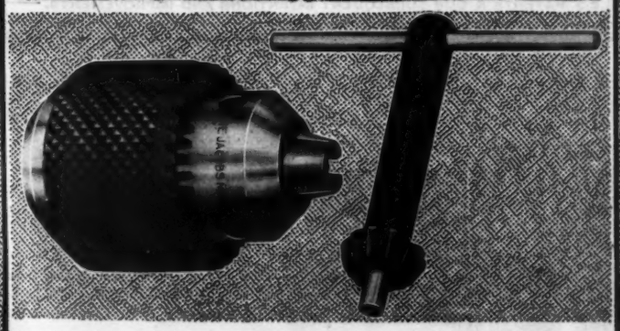

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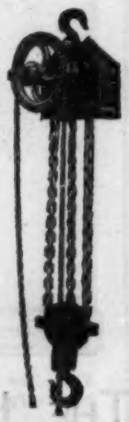

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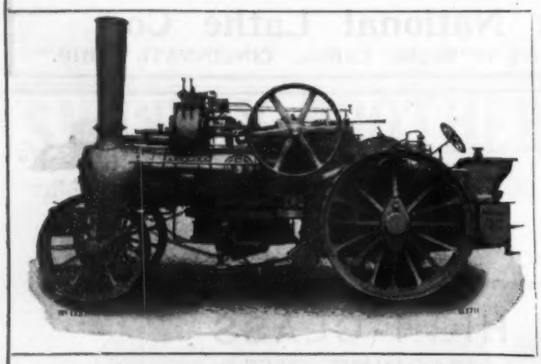

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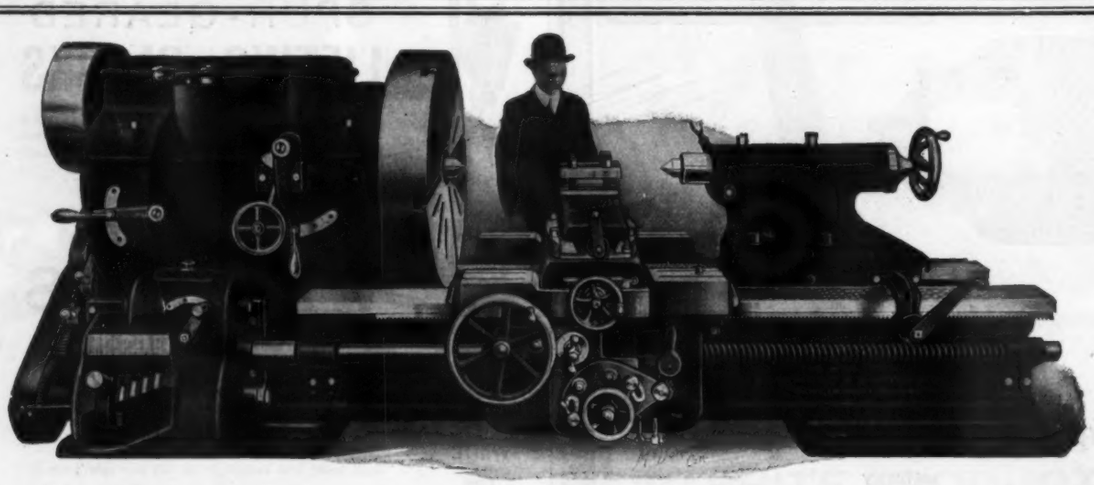

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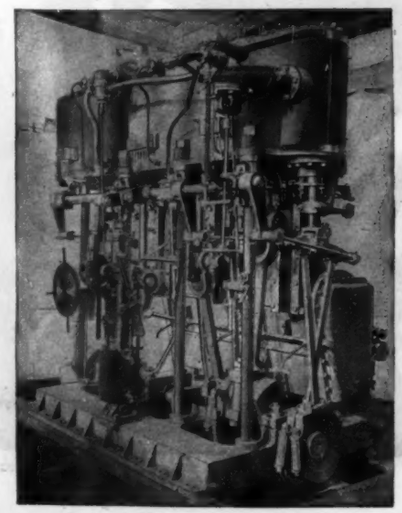

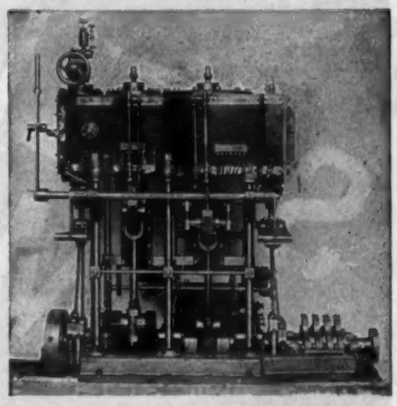

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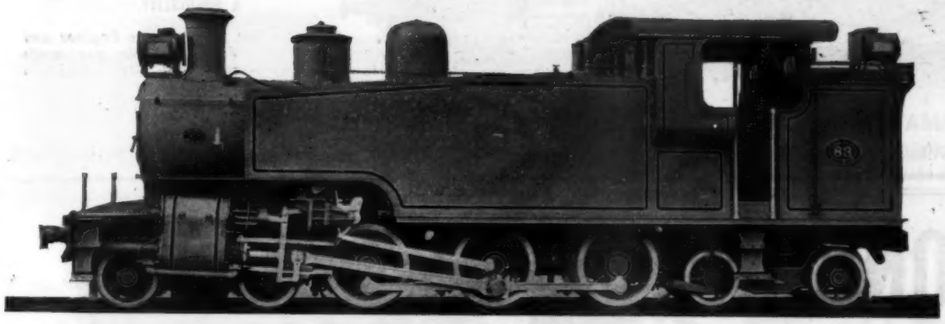

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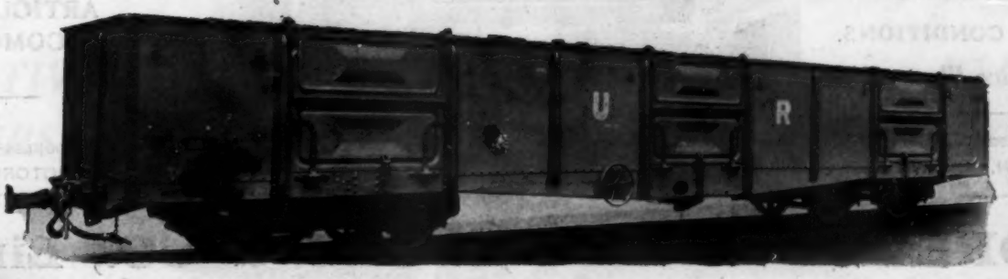

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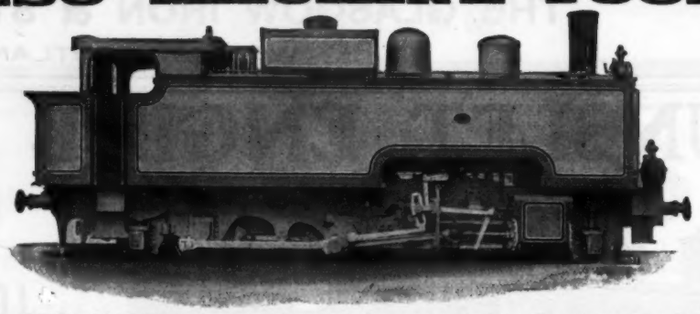

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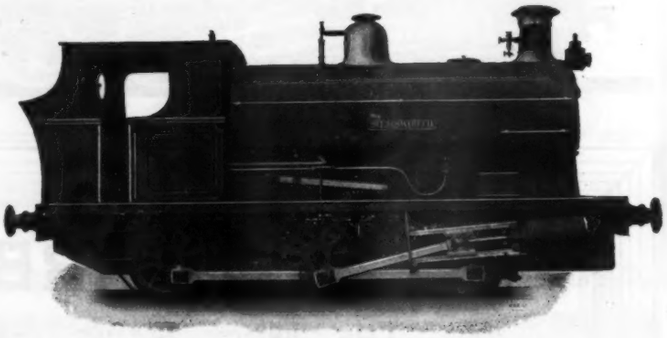

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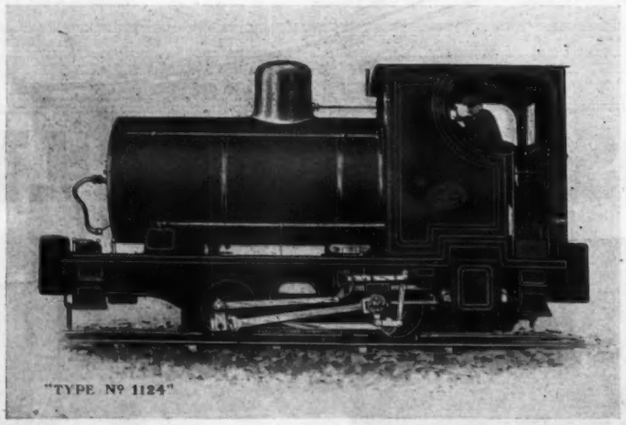

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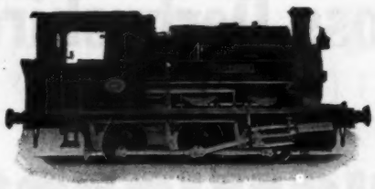
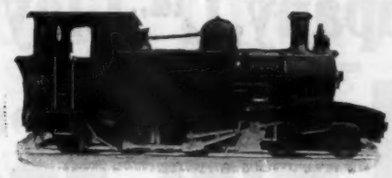

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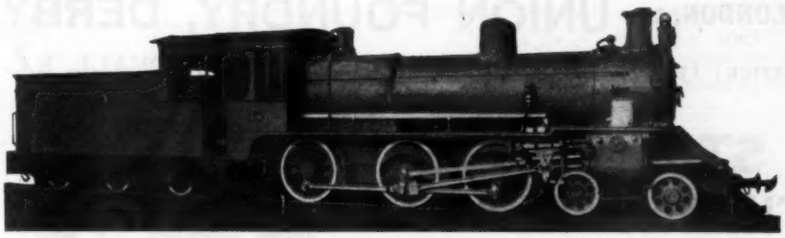

The illustration shows one of two locomotives built for the South Indian Railway, to that company's specification for Class "B" engines. The details include plate frames, copper fireboxes, superheaters, screw reverse gear, Walschaerts valve motion, Baldwin steam brakes on driving wheels, and vacuum brakes on tenders, with train connections. The weight of each locomotive in working order, exclusive of tender, is 34½ tons.

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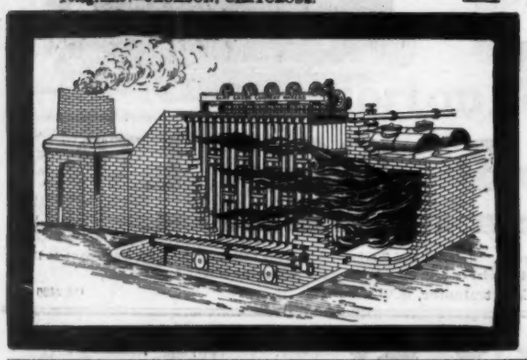

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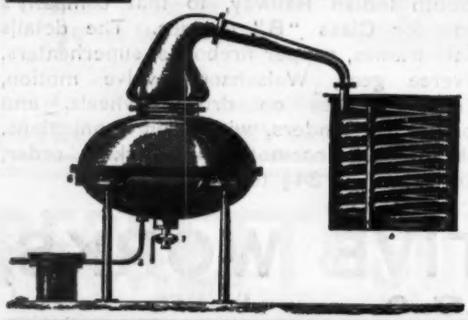

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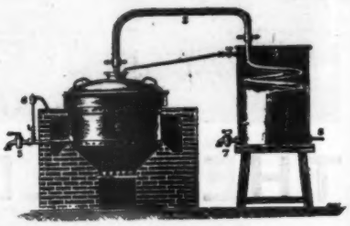

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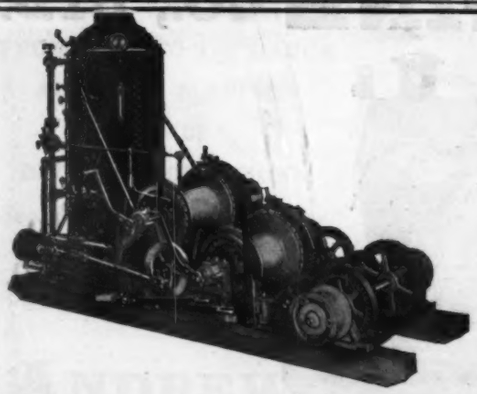

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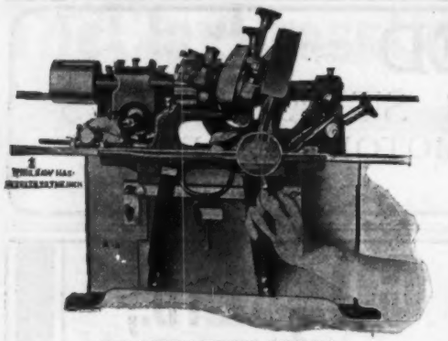

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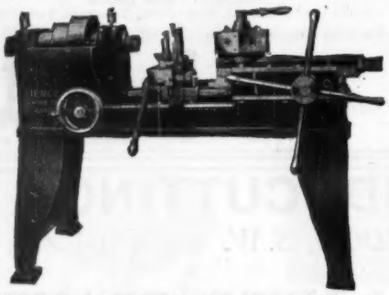

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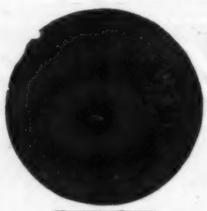

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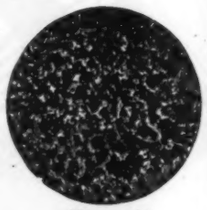

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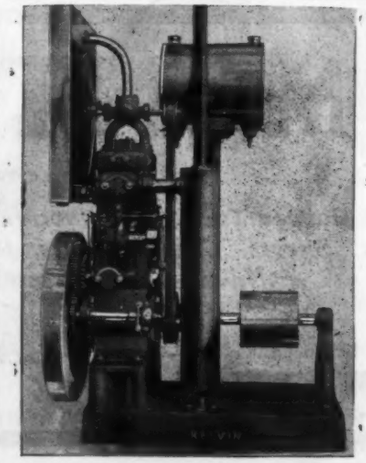

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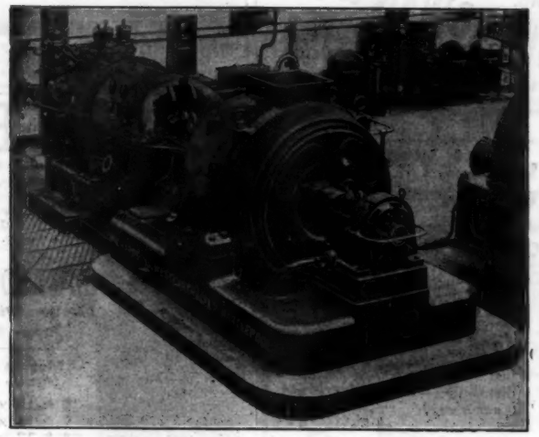

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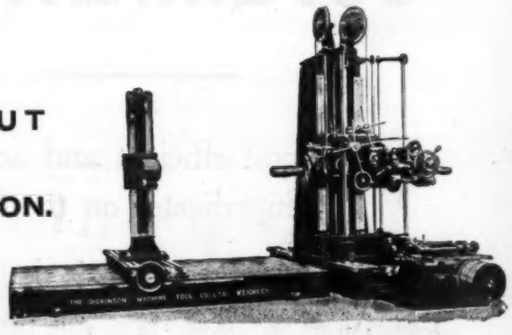

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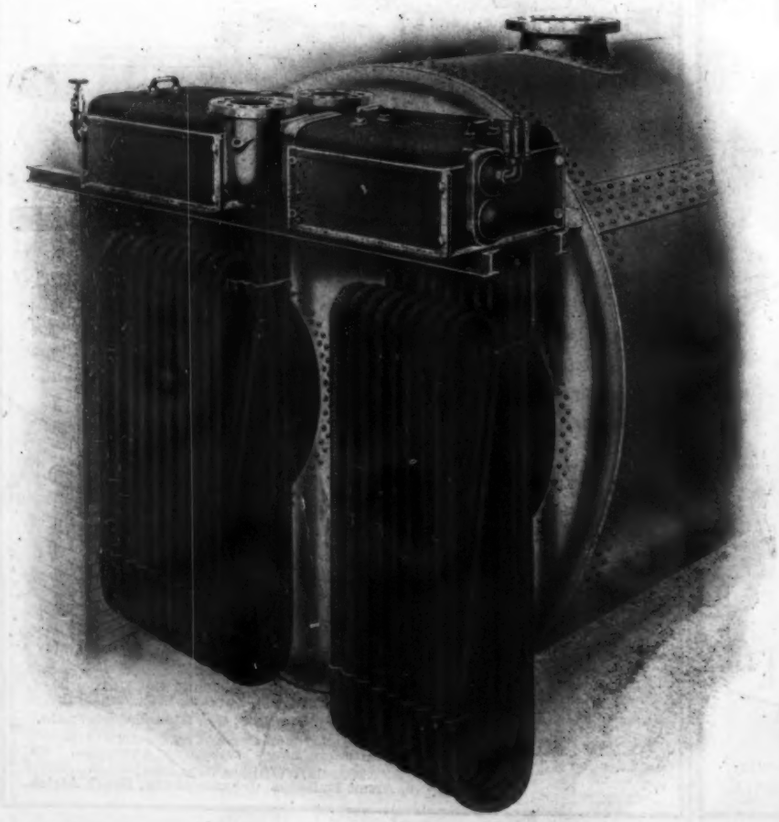

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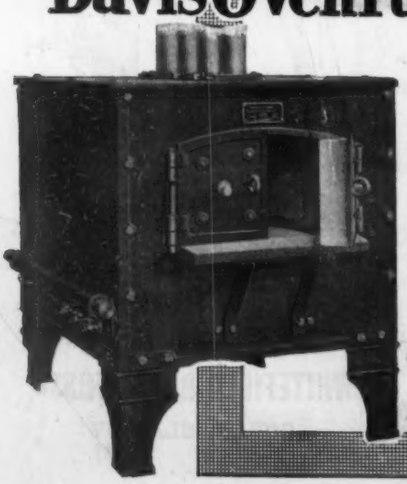

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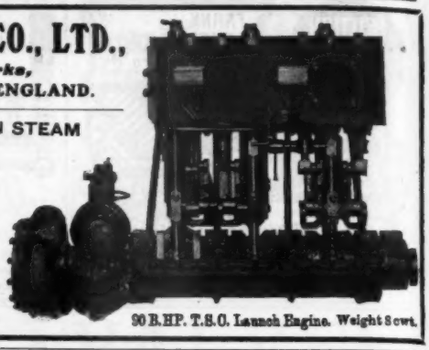
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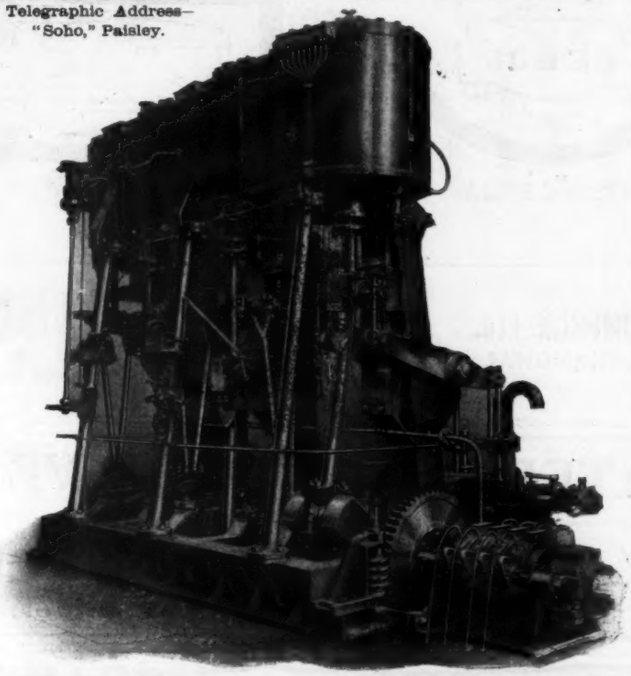

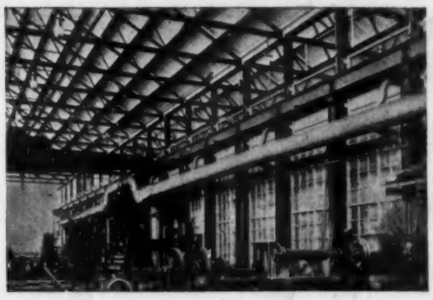

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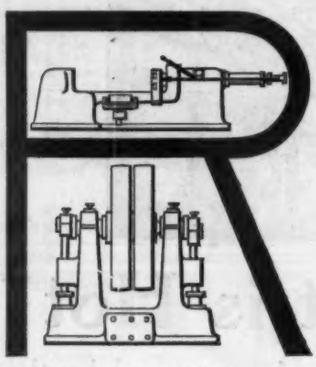

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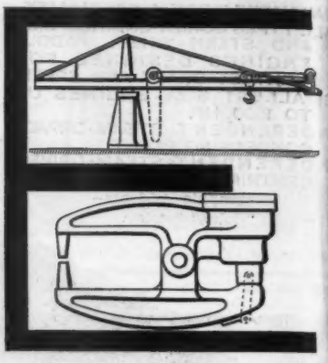

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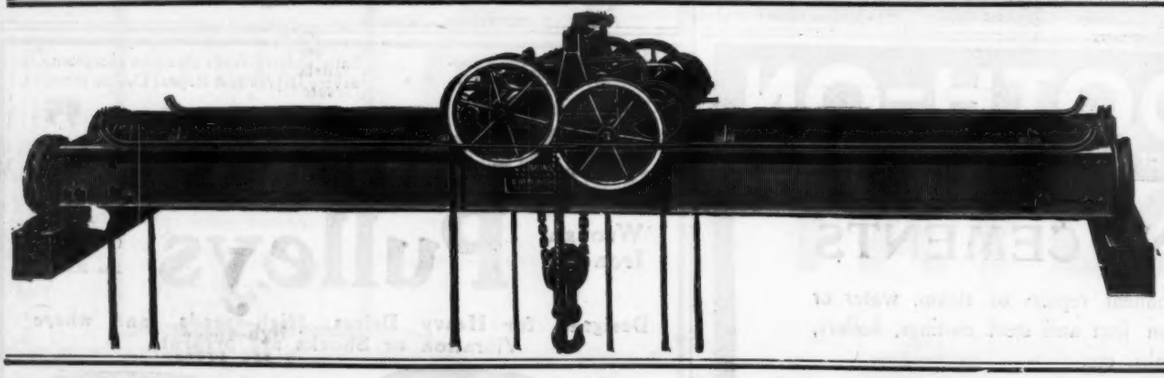

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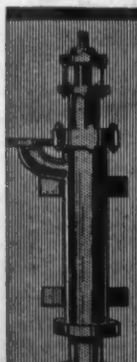

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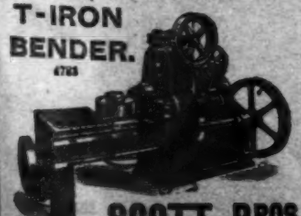
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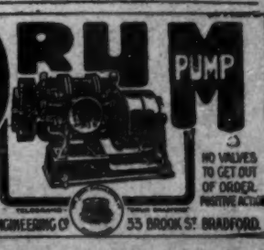
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